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EXTRACTION OF CAFFEINA FROM GUARANA.

By Francis V. Greene, M.D., U.S.N.

In determining the percentage of caffeina in guarana, Stenhouse ("Pharm. Jour.," 1st ser., vol. xvi, p. 212, "Amer. Jour. Phar.," 1857, p. 68) employed the following process: The finely powdered substance was boiled for some time with distilled water, the insoluble portion removed by filtration, and a slight excess of basic acetate of lead added to the filtrate. The resulting brownish-red precipitate was thoroughly washed with boiling water, and sulphuretted hydrogen gas passed through the filtered liquid. The sulphide of lead was filtered off, the filtrate evaporated to drynesss on a water bath, and the residue dissolved in a small quantity of boiling alcohol and filtered. On evaporating this liquid nearly to dryness, yellowish crystals were obtained, which, after being pressed between folds of bibulous paper, were dissolved in diluted alcohol. By the evaporation of this menstruum, the crystals of caffeina were obtained perfectly free from color.

In repeating this process for the purpose of estimating the quantity of caffeina contained in a specimen of guarana procured from the Brazilian collection at the Centennial Exhibition, the difficulty of separating the solution from the portion insoluble in boiling water, and the tediousness of the process of washing the mass precipitated by the acetate of lead solution led me to seek some other method by which these impediments might be avoided, and I therefore determined to attempt the separation by means of litharge, which substance has been highly recommended ("Amer. Jour. Pharm.," 1875, p. 135) by Prof. E. S. Wayne, for the extraction of caffeina from tea and coffee. The result, confirmed by several trials of the process, proves that this compound of lead answers equally well for guarana, and that by its employ-

ment the quantitative determination of the caffeina in this substance can be effected with the utmost facility.

The details of the method are as follows: the powdered guarana is intimately mixed with three times its weight of finely divided litharge, and the mixture boiled in distilled water, the ebullition being continued until, on allowing the temperature to fall below the boiling point, the insoluble portion is found to subside rapidly, leaving the supernatant liquid clear, bright, and without color. The quantity of distilled water required will be found to be about a pint for every fifteen grams of the guarana used in the experiment, and, as the boiling has to be continued for several hours before the desired and all-essential separation mentioned above takes place, water must be added from time to time to supply the place of that lost by evaporation. When cool, the clear liquid is decanted upon a filter, and when it has passed through, which it will be found to do with facility, the precipitate is to be transferred to the filter and washed with boiling water, the washing to be continued as long as yellowish precipitates are produced with either phosphomolybdic acid solution, auric or platinic chloride. A stream of sulphuretted hydrogen gas is now passed through the filtrate to remove the small quantity of lead that has been dissolved, and the sulphide thus formed separated by filtration. The solution is evaporated on a water bath to expel the excess of sulphuretted hydrogen, filtered to remove a trace of sulphur, finally evaporated to the crystallizing point, and the caffeina, which crystallizes out on cooling, removed from the mother liquor and pressed between folds of bibulous paper. After being thus treated the crystals will be found to be perfectly white. On diluting the mother liquor with distilled water, filtering and evaporating, a second crop of crystals are obtained, which are also perfectly white, after being pressed as above. The crystals are now dissolved in boiling diluted alcohol, filtered, and the solution set aside to crystallize by spontaneous evaporation. The resulting crystals of caffeina are perfectly pure and colorless.

In order to test the accuracy of the process, fourteen grams of guarana in an impalpable powder were treated with the utmost care, as above described. The extracted caffeina, after drying at 100° F. until the weight became constant, was found to weigh ·707 grams, 5·05 per cent., a remarkably close approximation to the results of Stenhouse,

who, from 25 grams of guarana, obtained 1·260 grams of caffeina = 5·04 per cent., and from 14 grams 5·1 per cent. Average = 5.07.

As this method of extracting caffeina is entirely devoid of all complicated steps, and requires but a short space of time for its completion, it may be used advantageously in estimating the percentage of caffeina in the fluid extract of guarana, which is prescribed to a certain extent at present, and may possibly be more extensively used in the future.

In regard to the proper accentuation of the name of the substance prepared from the seeds of the Paullinia sorbilis, by the Indian tribes on the upper Amazon, I would state that throughout Brazil, and in all parts of South America, where the preparation is used, the word is universally accented on the last syllable, *guaraná*, and never pronounced *guarána*, the popular method of accenting the term in this country. The placing of the accent on the last syllable in words ending in *a* is not at all unusual in the Guarany language; for instance, as regards localities, Paraná and Ceará, retain their Indian accentuation; and in the vegetable world, the Caladium esculentum is always spoken of as the Tajá or Tayá, the Franciscea uniflora as the Manacá, and the Gomphia parviflora, as the Batiputá.

NOTE ON HYPOPHOSPHITE OF BERBERINA.

By J. U. Lloyd.

Take of	Sulphate of berberina, . . .	1 part
	Distilled water, . . .	24 parts
	Lead monoxide, ...	½ part
	Hypophosphorous acid, . .	q. s.

Dissolve the sulphate of berberina in the distilled water at the temperature of 180°F. Add the lead monoxide, and digest at the above temperature until a filtered portion will not produce a precipitate with solution of acetate of lead (or a hot solution of chloride of barium); from 6 to 12 hours will accomplish this. Filter out the excess of lead and sulphate of lead formed, pass sulphuretted hydrogen through the solution to separate any traces of lead which may remain, and filter again. Evaporate the solution of berberina to the measure of 8 fluid-ounces, add solution of hypophosphorous acid until in slight excess, and allow the mixture to cool. Separate the magma of fine crystals with a filter paper or muslin strainer, and dry.

Hypophosphite of berberina is a beautiful yellow salt, much more soluble than the muriate.

By substituting other acids for the hypoposphorous almost any salt of berberina can be easily formed. When free from foreign substances, I have failed to find any salt of this alkaloid as soluble in cold water as the berberina itself, but the hypophosphite will dissolve readily to a considerable extent, and is the most desirable form I am acquainted with.

DIALYZED IRON.

By Andrew and H. C. Blair.

This preparation has attracted the attention of many of the pharmacists and medical profession of Europe for some time past, and the experience resulting from its use is so satisfactory, peculiar and wonderful, that it is probably destined soon to become one of our most valued therapeutic agents in a large class of diseases where the ordinary iron preparations are objectionable. "With this preparation," says an author, "we are able now to avoid all inconveniences which arise from the employment of ordinary ferruginous preparations."

Our attention was called to it some months ago through correspondence with a customer residing abroad, who spoke so highly of it, and mentioned such peculiar and wonderful properties it possessed, that led us to inquire more particularly into it. Further correspondence stated that this party had taken it as a remedial agent for a protracted period without the least inconvenience or unpleasant effect, and while under treatment in this country for the same ailment, the ordinary iron preparations were prescribed, but could not be taken for any considerable time without experiencing the common trouble so frequently complained of—headache, constipation, etc. Being interested in the matter, we obtained from a prominent French chemist a formula by which he was in the habit of making it, which is in substance as follows:

Take 10 parts liq. ferri per. chlor. (Br. Ph.), precipitate by aqua ammoniæ and wash the precipitate thoroughly. Mix this with 12 parts of liq. ferri perchlor. (Br. Ph.), and place in a dialyzer. The dialyzer is placed in a suitable vessel with distilled water, the water under it renewed every 24 hours. The operation is continued until no trace of chlorine exists, at which time the preparation is found to be neutral. It usually takes from 12 to 15 days to complete the process.

The resulting preparation is, or should be, of a deep dark-red color, and contains about 5 per cent. of the oxide of iron. As to the chemical condition of the iron in solution, M. Bravais, of Paris (who claims to produce the only genuine), says, "It consists of liquid peroxide of iron, *i. e.*, iron merely united with oxygen and water to the exclusion of all acids;" but it is, no doubt, in fact a neutral solution of an oxychloride of iron in a concentrated form, and the theory of its production is nothing new, and is very simple. The oxychloride (which is the substance retained in solution in the dialyzer) is a colloidal substance. The chloride (which is the principal substance rejected, or washed out as it were) is a crystalloidal substance. These two substances—crystalloid and colloid—are separated by dialysis, the former from the latter by diffusion through a septum, such as parchment paper.

Other formulæ more recently have been suggested, differing somewhat from the above, and it has been the subject of no little discussion abroad as to the particular merits of the one or the other of these. By some it has been suggested to pursue the following formula: Take a given quantity of liq. ferri perchlor. (Br. Ph.), and precipitate by ammonia, wash well the precipitate, and mix with sufficient quantity of the same preparation of liq. ferri perchlor. to saturation, and dialyze. It is remarkable how large a proportion of this freshly precipitated sesquioxide of iron will be taken up or dissolved. For example, the precipitate obtained from one pint of our officinal liquor ferri chlor., representing 3 ounces and 6 drachms of dry oxide, is entirely taken up by about 5 fluidounces of the same liquor. In the magma this precipitate seems a very great quantity, so bulky is it; and, as stated before, it is quite surprising to see it disappear into solution under the influence of so small a quantity of the liquor.

By following the above method, we have found that it shortened the process considerably. It became thoroughly dialyzed in one week, while the other takes about twice that time.

Still another method has been suggested, namely, to take a given quantity of the liquor ferri chlor., and add aqua ammoniæ almost enough to produce the precipitate of the sesquioxide. When the precipitating point is reached the whole solution is placed in the dialyzer. The chloride of ammonium is thus extracted from the solution, and the peroxide of iron, or oxychloride, retained.

If either of these processes is pursued carefully we have found the

same result to be reached. If the solution, after completion of the operation, should contain more than 5 per cent. of iron, it may be diluted with distilled water till it reaches that point. There are some dialyzed irons in market which we have examined, containing no more than from $3\frac{1}{2}$ to 4 per cent. When the preparation has become thoroughly dialyzed, it is tasteless and neutral, the operation should be discontinued, as by further dialysis the liquid is converted into a gelatinous condition.

We may say in closing, that the above formula furnishes an article precisely similar to the original Bravais' Dialyzed Iron, which we have imported and had ample opportunity for comparison. By manufacturing it in this country, it can be produced for about one-half the cost of the imported.

The manner of taking the pure concentrated dialyzed iron is generally in drops, ranging from 15 to 50 daily, in divided doses, on sugar or in sugar and water; suitable vehicles can be used for administration without fear of decomposition. Being without taste and odor, compatible with syrup and alcohol, and communicating no taste to any suitable vehicle, it is easy to construct formulæ for elixir, syrup, etc., a glycerite we find to be an excellent preparation.

These preparations, beside being more acceptable to the delicate palate, are perhaps preferable on account of the dose being brought up to the more popular measure of tea- and tablespoonful, and avoiding the necessity of the patient mixing them with any other liquid before taking.

NOTE ON DIALYZED IRON.

By John M. Maisch.

Dialyzed iron, which will doubtless become one of the most valuable ferruginous medicinal agents, has been recently introduced into the United States, under various names. Some claiming it to be a solution of *oxide of iron* in water, it was, and is still frequently called in Europe, *ferrum oxydatum dialysatum*; but like the very similar preparation, *ferrum oxydatum saccharatum*, which has been made officinal in several European pharmacopœias ("Am. Jour. Phar.," 1873, p. 161; 1874, p. 559), it is nothing more nor less than a very basic oxychloride of iron. To prevent erroneous conceptions concerning its composition gaining a foothold, a brief review of the earlier literature on the subject will not be out of place.

The first paper on this subject deserving notice is one by John M. Ordway, entitled "Examination of the soluble basic sesquisalts," which was published in the "Am. Journal of Science and Arts," 2d ser., xxvi, p. 197 (1858), and in which the following language is used: "Time is a very important element in the production of the highly basic compounds. One may easily be deceived as to when the hydrate ceases to be dissolved, and may set down as opaque that, which by longer digestion becomes quite transparent. By successive steps we get pretty easily as far as $Fe_2Cl_6,11Fe_2O_3$, and in the course of several weeks I have gone as high as $Fe_2Cl_6,23Fe_2O_3$."

The next important paper is by Béchamp (1859), published in "Annales de Chimie et de Physique," 3d ser., lvii, 296, which in the main corroborates the statements of Ordway, but gives the most basic compound obtained Fe_2Cl_6, $20Fe_2O_3$. In both cases the solutions of the normal salt were digested with ferric hydrate.

Th. Graham's celebrated essay on the diffusion of liquids ("Phil. Trans.," 1861, 183) announces the following results: "If recently precipitated ferric hydrate or carbonate of ammonium is added to an aqueous solution of ferric chloride, as long as the precipitates are redissolved, and if the dark-red solution thus obtained, containing from 4 to 5 per cent. of solid matter, is subjected to dialysis, mainly muriatic acid will pass through the septum upon which, after 19 days, remains a red liquid containing for 98·5 parts of oxide 1·5 part of muriatic acid. It remains liquid for 20 days and then gelatinizes, separating ferric hydrate. A similar solution of colloidal ferric hydrate may be obtained by dialysis of ferric acetate, and contains 6 parts of acetic acid to 94 parts of ferric oxide."

Calculating Graham's results as an oxychloride, the formula Fe_2Cl_6, $95Fe_2O_3$ would be obtained, which seems to be hardly probable. At the same time, it must be remembered, that none of the so-called soluble oxide of iron has as yet been obtained free from acid. Graham's figures, I believe, are the lowest thus far observed, and the solution was not permanent, but gelatinized spontaneously. It must therefore be granted that any permanent solution of so-called soluble oxide of iron must contain notable quantities of acid; and within the past year such has been proven by Hager to be the case for several European preparations sold as oxide of iron.

The behavior of these solutions is quite curious and apt to mislead,

unless care be taken to arrive at correct results. They will retain their clearness on boiling, are miscible with alcohol, glycerin, syrup, etc., but readily yield precipitates on the addition of acids not in excess, or of saline solutions, the precipitates disappearing again on diluting with distilled water. Tannin added in small quantities, darkens the solution somewhat, and on filtering leaves but little matter in the funnel; on using a stronger solution of tannin a well diffused gelatinous precipitate takes place, having a deep brown, but not a black color, and the filtrate is colorless. Solution of nitrate of silver added in small quantity does not disturb the transparency of the liquid; on adding more of the former a gelatinous *brown* precipitate takes place, and the colorless filtrate is free from iron, but the addition of distilled water causes the precipitate to dissolve again. Apparently, therefore, the solution is free from chloride; but on adding first a slight excess of ammonia, filtering from the ferric hydrate, acidulating with nitric acid and then testing with nitrate of silver, a white precipitate of chloride of silver is formed. All these reactions as well as the slight astringent, not inky taste, and the intense brown-red color have been observed by the investigators named above, and they characterize also the commercial products. A sample recently handed to us, and said to contain no, or only traces of chlorine, yielded when treated as above, abundant evidence of its presence.

Physicians and pharmacists should, therefore, bear in mind that there is *no soluble oxide of iron*, but what is sold as such, be it imported or made in this country, is *very basic oxychloride of iron*. This being the case, the question naturally presents itself whether such a solution cannot be obtained by saturating a solution of ferric chloride with hydrate of iron. That question is easily answered if the behavior to saline solutions is taken into consideration and the fact is remembered that, when solutions of ferric salts are precipitated by alkalies the ferric hydrate will invariably retain small quantities of the precipitant, which cannot be removed by washing with water. These saline impurities, minute as they may be, are sufficient to prevent the formation of the very basic oxychloride, or if formed it becomes insoluble in the liquid and nothing but dialysis or considerable dilution with distilled water can dissolve it again. To obtain it of the maximum strength indicated by Graham (5 per cent.) and also adopted by the Pharmaceutical Society of Paris (see page 349), dialysis appears to be unavoidable.

As to the advantage of the dialyzed over the oxychloride made by

saturation with hydrate of iron, that is best ascertained by comparing their taste, which in the former is scarcely astringent, while that of the latter is distinctly ferruginous. A preparation now before me, imported from Germany, called Ferrum oxydatum dialysatum, I do not hesitate to say has been made by saturation alone, or by incomplete dialysis; for its reaction is distinctly acid and its taste quite styptic. Some French preparations, sold by the same name, were found to be superior to the German in both respects; but one yielded only 3·3 per cent. of solid matter, another less than half that quantity. A 5 per cent. solution of dialyzed iron should yield 3 grains of dry residue when 60 grains of it are carefully evaporated to complete dryness.

The characteristics of a 5 per cent. solution of dialyzed iron may be stated to be—

1. The deep brown-red color, which in thin layers is perfectly transparent.
2. The freedom from odor and taste, it being merely faintly astringent to the palate.
3. The absence of even slight acid reaction to test-paper; and
4. The behavior to tannin and to saline solutions (even spring water), as stated above.

It is best given by itself upon sugar, or mixed with some simple syrup which is free from acid. It should be mentioned yet that the same preparation has made its appearance in Austria as *catalytic iron*.

EMULSION OF OIL OF TURPENTINE.

By Louis Genois.

Emulsionizing oil of turpentine and volatile oils generally is considered a rather difficult operation, and many pharmacists have come to the conclusion that an elegant and somewhat permanent mixture is almost impossible. Various methods have been suggested to overcome the difficulties, but none have been very successful; the latest process I believe is that of Mr. Forbes, published in February, 1872, in the "Amer. Jour. Phar.," and though it is both ingenious and rapid of execution, it hardly affords a satisfactory result. With the view of ascertaining the possibility of finding a substance that would answer the purpose better than anything usually employed, I made a number of experiments with the following: gum tracaganth, dextrin, starch and castile soap.

I found the latter to better possess the properties of a suspending medium than any other, the mixture with it retaining its homogeneousness almost indefinitely, besides it has the advantage of having some similar properties to the turpentine, and would be a valuable adjunct as well as a useful addition in many cases. The smallest proportion that I have found to answer is 10 grains of soap, 1 ounce of oil, to any quantity of water; the soap is to be put into a round bottomed mortar, the oil added by degrees with continual trituration; when well mixed transfer to a bottle, add half an ounce of water, shake vigorously, add a little more water, shake again, and the emulsion is made, is very white, and will not separate on the addition of a gallon or more of water. The soap should be perfectly dry and in very fine powder, otherwise it will not do as well; it is obvious that any other volatile oil can be treated in the same manner, and will afford equally good results.

New Orleans, June 10th, 1877.

THE USE OF GLYCERIN IN FLUID EXTRACTS.

By John Wesley Lehman, Ph.G.

(*From an Inaugural Essay.*)

A number of experiments were made with officinal and unofficinal fluid extracts, with the view of determining the preservative qualities of glycerin in this class of preparations. The results obtained may be tabulated as follows:

Fluid Extract of	Menstruum.	Remarks.
Aconite root,	Alcohol 3 p., glycerin 1 p.,	Dark reddish-brown, after 2 weeks muddy; filtered, became again turbid.
" "	Alcohol,	Of lighter color; remained clear.
Asclepias tuberosa,	Dil. alcohol 3 p., glycerin 1 p.,	Gelatinized in 4 weeks.
" "	Alcohol 2 p., water & glycerin each 1 p.,	Did not gelatinize; slight precipitate.
Buchu,	Alcohol 3 p., glycerin 1 p.,	Dense precipitate in 5 days.
Conium (leaves?),	Officinal,	Dark and clear; slight precipitate in two weeks.
Digitalis,	"	" "
Ergot,	"	" "
Grindelia robusta,	Dil. alcohol 3 p., glycerin 1 p.,	" "
Hyoscyamus,	Officinal,	" "
Krameria,	"	Brown-red; clear.
Prunus Virginiana,	Officinal,	Soon turbid, and considerable precipitate.
" "	Water 8 fl. oz., afterwards glycerin and dilute alcohol equal p.,	Slight precipitate after 4 weeks.
Stramonium,	Officinal,	Dark and clear; slight prec. on standing.
Valeriana,	"	Remains clear.
"	Alcohol 3 p., glycerin 1 p.,	Very muddy in two weeks; filtered, muddy again in one week.
"	Alcohol 8 p., glycerin 1 p.,	Slight precipitate in two weeks; filtered, very slight change afterwards.
Zingiber,	Officinal,	Remains clear.
"	Alcohol, with small prop. of glycerin,	Precipitated some in 5 days.

The author concludes that the use of glycerin in fluid extracts of astringent drugs adds much to the beauty and stability of the prepara-

tion. Its use appears also to be indicated for those drugs the active principles of which are soluble in water and dilute alcohol. In fluid extracts of mucilaginous drugs like pleurisy root it cannot be used to any great extent, and it is best discarded altogether in all cases where the active principle is of a resinous nature.

EXTRACTUM GLYCYRRHIZÆ DEPURATUM AND AMMONIACAL GLYCYRRHIZIN.

By Gustav A. Appenzeller, Ph.G.

From an Inaugural Essay.

The author recommends to dispense in liquid preparations, and more particularly in the officinal Mist. Glycyrrh. comp., the purified extract of liquorice of the German Pharmacopœia in place of powdered liquorice. It is prepared by putting into a suitable vessel alternate layers of straw and commercial liquorice, covering with cold filtered water, drawing off the liquid from time to time and evaporating to the consistence of a thick syrup. It yields a clear solution with water, and an excellent *syrup of liquorice* may be prepared from it by mixing one ounce with a pint of simple syrup.

The following brands of liquorice yielded the amounts of extract [of what consistence?] stated below: Duca di Corigliana 77·24, M. & R. 72·66, P. & S. 61·22, A. & S. 60·91, and Noëly 58·92 per cent. The residues, insoluble in cold water, had a similar appearance, and contained starch.

Ammoniacal glycyrrhizin was prepared according to Roussin, by exhausting the bruised root with little water, boiling the liquid, removing the coagulated albumen, precipitating with hydrochloric acid, washing the precipitate, dissolving in ammonia and drying upon glass, when yellowish scales having the taste of the root were obtained.

By exhausting the root with diluted ammonia water, evaporating and drying on glass, a considerably larger quantity of somewhat darker colored scales were obtained. A similar but still darker colored preparation results if liquorice is treated in the same manner. The scales made from the root are more pleasant in taste, particularly if Russian liquorice root, deprived of the brown cortical layer, is used.

FORMULAS and PREPARATIONS of new MEDICAMENTS.

By the Editor.

In continuation of the formulas discussed and adopted by the Paris Pharmaceutical Society (see p. 233), we select the following:

Solution of sodium phenate (*Phénol sodique.*)—Phenic acid 70 grams, caustic soda 30 grams; water sufficient to make 1 liter.

Syrup of Chloral Hydrate.—Dissolve 50 grams of crystallized chloral hydrate in 950 grams of orange-flower syrup. A tablespoonful (20 grams) contains 1 gram of chloral hydrate.

Tincture of Quillaia.—100 grams of quillaia bark are digested in 500 grams of alcohol in a suitable apparatus, placed in a water-bath, the temperature being maintained near the boiling point for half an hour; the whole is then macerated for 48 hours with occasional agitation and afterwards filtered. The tincture is mainly employed in preparing emulsions of substances insoluble in water, such as *copaiba*, *tar*, *oil of cade*, which are made according to the formula for

Emulsion of Tolu Balsam.—Dissolve 2 grams of balsam of tolu in 10 grams of 90 per cent. alcohol, add 10 grams of tincture of quillaia and mix with 78 grams of hot water.

Preparations of Eucalyptus Globulus.—The infusion, wine, elixir and extract are made from eucalyptus leaves, in the same manner as the corresponding preparations of coca. (see p. 236.)

Water of Eucalyptus.—Distil 1 part of dry eucalyptus leaves with sufficient water to obtain 4 parts of distillate.

Syrup of Eucalyptus.—Infuse 50 grams of eucalyptus leaves for three hours with sufficient water to obtain, after expression and filtration, 250 grams of infusion, add 100 grams of distilled eucalyptus water and dissolve in the liquid 650 grams of sugar, using a covered vessel placed in a water-bath.

Tincture of Physostigma.—Macerate 100 parts of powdered Calabar bean in 500 parts of 80 per cent. alcohol for 10 days; express and filter.

Glycerite of extract of physostigma is made in three different proportions. The alcoholic extract of Calabar bean is well mixed with 10, 20 or 100 times its weight of glycerin and dissolved by the aid of a moderate heat. It should be completely dissolved.

Bromide of Iron.—The solution of this salt does not keep well, and is at once made up into syrup or pills. It is made by using 40 grams of iron filings, 216 grams distilled water and 80 grams bromine, and contains one-third its weight of ferrous bromide.

Pills of Ferrous Bromide. — 15 grams of the preceding solution and 10 grams powdered iron are evaporated in a porcelain capsule, until the water has been driven off; the mass, while still hot, is transferred to a warm mortar, mixed with sufficient powdered gum arabic and licorice root until a mass is obtained, which is divided into 100 pills; they are to be rolled in lycopodium or covered with a mixture of gum and sugar.

Syrup of Ferrous Bromide.—15 grams of the solution are mixed with 985 grams of syrup of gum, flavored with orange-flower water.

Ferrous chloride is made by dissolving iron in hydrochloric acid and evaporating the filtered solution rapidly to dryness.

Syrup of Ferrous Chloride.—Dissolve 5 grams of dry ferrous chloride in 20 grams of orange-flower water, and add 800 grams syrup of gum and 175 grams syrup of orange-flower.

Pills of Ferrous Chloride.—Dry ferrous chloride, powdered marshmallow-root, each 10 grams, mucilage sufficient. Make into 100 pills, which are to be silvered.

Dialyzed Oxide of Iron.—100 grams solution of ferric chloride of 30°B., are mixed in small quantities with 35 grams ammonia water of 22°B. The precipitate dissolves at first rapidly, afterwards very slowly. When the liquid has become transparent it is introduced into a dialysator, and this placed in distilled water, which is to be frequently renewed, until the liquid is no longer precipitated by nitrate of silver and is destitute of acid reaction. It still contains a small quantity of hydrochloric acid, which may be recognized by precipitating with ammonia, acidulating with nitric acid and testing with silver nitrate. 10 cc. of the liquid, which is entirely free from disagreeable ferruginous taste, are evaporated, and from the weighed residue the amount of water is calculated which must be added to obtain a solution containing in 100 cc. 1 gram of solid matter.

Syrup of Ferrous Chlorhydro-phosphate.—Ferrous chloride, medicinal phosphoric acid, of each 5 grams; distilled water 350 grams; sugar 640 grams. Make a syrup.

Syrup of Pyrophosphate of Iron and Sodium.—Dissolve 25 grams of sodium pyrophosphate in 250 grams of distilled water, and 5 grams of dry ferric sulphate in 100 grams of water; add this last to the former solution, and in the clear and colorless liquid dissolve 620 grams of sugar.

The *solutions* of the two last preparations are obtained by omitting the sugar and adding enough distilled water to make 1 liter of solution.

Glycerites of subnitrate of bismuth, of laudanum, of extract of lead and of extract of rhatany are made with 90 parts glycerite of starch by mixing it intimately with 10 parts of subnitrate of bismuth, of Sydenham's Laudanum, of Goulard's Extract, or of extract of rhatany, the latter to be previously dissolved in the smallest possible quantity of glycerin.

Tar Water.—The wood tar should be of a red-brown color, transparent and free from resinous deposits. Mix 5 grams of such tar intimately with 10 grams of pine-wood sawdust, and macerate for 24 hours with 1,000 grams of distilled or rain water, stirring frequently.

Syrup of Tar.—15 grams of tar and 30 grams pine-wood sawdust are mixed, and digested at 60°C. with 1,000 grams water, with occasional agitation. Filter at the end of two hours upon the sugar, 190 grams of which are to be used for every 100 grams of the filtrate, and effect the solution in a closed vessel, heating it by means of a water bath.

Syrup of Iodotannin, *Sirop Iodotannique.*—Dissolve 1 gram of iodine in 11 grams of 90 per cent. alcohol, add to syrup of rhatany (containing 2·5 per cent. of extract of rhatany) 988 grams, and mix well. The combination will be completed at the ordinary temperature in 24 hours, when the syrup has again its original color.

Iodinized syrup of horseradish is made in precisely the same way as the preceding, substituting the same weight of compound syrup of horseradish.

Syrup of Iodide of Starch.—Dissolve 10 grams of soluble iodide of starch in 330 grams of distilled water, and use this solution for dissolving 640 grams of sugar, by the aid of a gentle heat.

Pilocarpina.—The leaves or bark of Pilocarpus pennatifolius are exhausted with 80 per cent. alcohol, containing in the liter 8 grams of hydrochloric acid, and the tincture is distilled and evaporated to the consistency of a liquid extract, which is mixed with a small quantity of

water, and filtered. The filtrate is treated with a slight excess of ammonia, and then with a large quantity of chloroform. The chloroform solution is agitated with water, to which hydrochloric acid is added, drop by drop, in sufficient quantity to neutralize the alkaloid, the hydrochlorate of which is obtained in long needles on evaporating the aqueous solution, while foreign principles remain dissolved in the chloroform. By dissolving the crystals in water, treating the solution with ammonia and chloroform, and evaporating the latter solution, pilocarpina is obtained as a soft viscous mass, which is little soluble in water, but freely soluble in alcohol, ether and chloroform.

Effervescing Carbonate of Lithium.—Take of citric acid 40 grams, bicarbonate of sodium 50 grams, and carbonate of lithium 10 grams. Powder and mix well, then introduce into a wide flat-bottomed dish, and heat to about 100°C. (212°F.), stirring constantly until the powder becomes granular. Separate the granules of uniform size by means of appropriate sieves, and preserve them in well-stopped bottles.

Extract of Malt.—Take of malt, the germ of which has attained two-thirds the length of the grain, dry at 50°C. (122°F.), grind and treat it with two parts of water at the ordinary temperature, stirring the mixture occasionally. After 5 or 6 hours express, strain, filter and evaporate in a shallow dish at a temperature not exceeding 45° C. (113°F.)

Syrup of Narceina.—Dissolve 1 gram of narceina in 100 grams of water, containing ·6 gram hydrochloric acid; add to the solution 250 grams of water, and then dissolve 650 grams of white sugar. Each tablespoonful of 20 grams contains ·02 gram ($\frac{1}{3}$ grain) of narceina.

Pancreatin.—Pancreas is freed from foreign matters, bruised and mixed with water containing some chloroform to prevent decomposition. After some time the mass is expressed and the liquid filtered and evaporated rapidly in shallow dishes by means of a current of air, at a temperature not exceeding 45°C. (113F.) ·10 gram of pancreatin digested with 5 grams of fibrin and 25 grams of water, at a temperature of 50°C. (122°F.) for 12 hours, yields a solution which, when filtered, is scarcely rendered turbid by the addition of nitric acid. ·10 gram of pancreatin, added to 100 grams of paste containing 5 grams starch, yield a liquid which filters easily and decolorizes 4 times its volume of Fehling's solution.

THE SPIRIT OF NITROUS ETHER OF THE U. S. P., 1870.

By C. Lewis Diehl.

(*Read at the Pharmaceutical Meeting of the Louisville College of Pharmacy, held June 7th, 1877.*)

About eighteen months ago I had occasion, for the first time, to prepare spirit of nitrous ether by the process of the present "Pharmacopœia." Operating with the pharmacopœial quantities, and observing the care which a considerate experience in the manufacture of this product by the old method had taught me, I obtained results somewhat at variance with the requirements and statements of our standard. I have since had opportunity to confirm the results then obtained, and propose in this paper to discuss these, together with such additional observations as are pertinent to the subject.

The methods which have been proposed from time to time for the preparation of nitrous ether, or its medicinal solutions, differ mainly in the manner in which two principal methods are applied: the one producing nitrous ether by the direct action of nitric acid on alcohol; the other by the direct action of nitrous acid on the same liquid. The first named method is the older one, and is the one that was discarded at the last revision of our "Pharmacopœia." The product of the direct action of nitric acid upon alcohol, irrespective of the modification of the method, always contains, besides nitrous ether, variable quantities of acetic and formic ethers, and aldehyd: the relative quantities of these depending on the temperature, quantities operated on, etc. By the second method—the direct action of nitrous acid on alcohol—nitrous ether is formed, it is claimed, to the exclusion of the other compounds, and this is the method applied in the process of the present "Pharmacopœia." This process, which is practically identical with that of the "British Pharmacopœia," was proposed in 1867, by Professor Theophilus Redwood. In the very interesting paper in which the process is described,[1] Professor Redwood reviews the various methods that have at different times been suggested, and, among these, finds that of E. Kopp for the production of nitrous ether to be, with certain modifications, the one suited to secure uniformly a spirit of definite strength and purity. Kopp's process consists in heating a mixture of equal volumes of nitric acid, sp. gr. 1·36, and rectified

[1] "Phar. Jour. and Trans.," viii, 508; "Am. Jour. Phar.," 1867, 321.

spirit in contact with copper filings, and, when chemical action has commenced, withdrawing the heat and allowing the distillation to go on spontaneously. The process, however, while well suited for the preparation of nitrous ether, is wasteful and, consequently, expensive; while, at the same time, the reaction does not proceed with the desired regularity. After numerous experiments, Professor Redwood found that by the introduction of certain proportions of sulphuric acid, the complete utilization of the nitric acid for the formation of nitrous ether, with a minimum consumption of copper, could be secured, and that the reaction took place with the utmost regularity. The proportions found to work best, and these have been retained without change in the "British Pharmacopœia," are:

Nitric acid, sp. gr. 1·42,	3 fluidounces
Sulphuric acid, sp. gr. 1·843,	2 "
Copper, in fine wire (about No. 25),	2 ounces
Rectified spirit (for the reaction),	20 fluidounces
Rectified spirit (for diluting the distillate),	2 pints

Professor Redwood's directions for manipulating these ingredients have been adopted *verbatim* in the "British Pharmacopœia," and our own standard has essentially adopted the same directions; hence it is not necessary to reproduce them here. He further explains, that at a temperature of 150°F. bubbles begin to rise in the liquid in the retort; that these increase to 170°F., when ether begins to form, and that when it reaches 175°F. the reaction proceeds rapidly and steadily until the nitric acid is all expended, without any further rise in temperature if the heat is properly adjusted. The completion of the process is indicated by the dissappearance of the froth—which is caused by chemical reaction, and not by boiling—and the distillate will then amount to *about* 12 fluidounces. The remaining one-half fluidounce of nitric acid is added "for the purpose of converting the undecomposed spirit still in the retort into nitrous ether." The 15 fluidounces of distillate contain 35 per cent. of *crude* ether. When mixed with the remaining two pints of spirit, a product results which has a sp. gr. of 0·845, and when mixed with twice its volume of concentrated solution of chloride of calcium, separates from two to three per cent. of nitrous ether. This indicates ten per cent. of ether [crude?], as eight per cent. remain in solution.

Comparing now the process of the United States with that of the

"British Pharmacopœia," it becomes evident that the changes made were necessary in order to secure a product conforming, as near as possible, with that of the "United States Pharmacopœia" of 1860. These changes at once become evident on consulting the following:

Analytical comparison of the U. S. and Br. Ph. processes for preparing Spirit of Nitrous Ether, to which I shall have occasion to refer in the following pages:

A. *Weights and Measures.*

	British.	United States.
Measures,	Imperial.	Apothecaries'.
Weights,	Avoirdupois.	Troy.

B. *Quality of Ingredients.*

	British.	United States.
Copper,	As wire.	As wire.
Nitric acid,	sp.gr. 1·42 =75 p.ct. $HONO_5$	Same as Br.
Sulphuric acid,	sp.gr. 1·843=96 p.ct. $HOSO_3$	Same as Br.
Alcohol,	sp.gr. 0·838=84 p.ct. $C_4H_6O_2$	sp.gr. 0·817=92 p.ct. $C_4H_6O_2$

C. *Quantity of Ingredients.*

	British.	United States.
Copper,	2 oz.= 875·0 grs.	2 oz.= 960 grs.
Sulphuric acid,	2 f.oz.=1612·6 grs.	3½ oz.=1680 grs.
Nitric acid, 1st portion,	2½ f.oz.=1553 0 grs.	4 oz.=1920 grs.
Nitric acid, 2d portion,	½ f.oz = 310·6 grs.	½ oz.= 240 grs.
Alcohol, for the react'n,	20 f.oz.=7332·5 grs.	20 f.oz.=7445 grs.
Alcohol, for dilution,	40 f.oz.	92 f.oz.

D. *Relation of water to absolute alcohol and monohydrated acids.*

	British.	United States.
Absolute alcohol,	6159·0 grs.	6830·0 grs.
Water from alcohol,	1173·0 grs.	615·0 grs.
Monohydrated nit. acid,	1397·7 grs.	1620·0 grs.
Water from nit. acid,	465·9 grs.	540·0 grs.
Monohydrated sul. acid,	1561·0 grs.	1624·0 grs.
Water from sul. acid,	51·6 grs.	55·7 grs.
Total weight of absol. alc. and monohydrated acids,	9117·7 grs.	10084·0 grs.
Tot'l weight of wat'r,	1690·5 grs.	1210 7 grs.
Total weight of liquids used in the react'n,	10808·2 grs.	11295·0 grs.
Percentage of uncombined water,	15·64 per cent.	10·72 per cent.

E. *Relation of $HONO_5$ to $C_4H_6O_2$ used and consumed in the reaction.*

	British.	United States.
$HONO_5$,	1·0 weight part.	1·0 weight part.
$C_4H_6O_2$, used in the reaction,	4·406 "	4·216 "
$C_4H_6O_2$, consumed by the reaction,	0·730 "	0·730 "
Absolute amount of $C_4H_6O_2$ consumed,	1020·5 grains.	1142·8 grains.

F. *Results according to the standards.*

	British.	United States.
First distillate,	12 fluidounces.	13 fluidounces.
Second distillation,	3 "	2 "
Total distillation,	15 "	15 "
Total spirit,	55 " (more or less.)	107 " (exact.)
Specific gravity of spirit claimed,	0·845	0·837
Percentage of nitrous ether in spirit claimed,	10 per cent.	5 per cent.

G. *Increase in the ponderability of the product over that of the alcohol used.*

	British.	United States.
1000 volumes of alcohol weigh:	838 parts.	817 parts.
1000 volumes of spirit of nitrous ether weigh:	845 parts.	837 parts.
Increase by the introduction of the respective percentages of nit. ether,	7 parts.	20 parts.
Increase for 1 per ct. of nitrous ether,	0·7 parts.	4·0 parts.

H. *Possible quantity of nitrous ether ($C_4H_5ONO_3$) produced by the respective processes.*

	British.	United States.
Absolute quantity by volume,	4·0145 f.oz.	4·469 f.oz.
Absolute quantity by weight, the sp. gr. of nitrous ether being 0·947,	1663·26 grs.	1928·5 grs.
Possible percentage of absolute nitrous ether in the spirit,	7·298 per cent.	4·1766 per cent.

In the course of my experiments numerous questions presented themselves for solution, the most important of which I shall endeavor to answer in the present paper, in the order below given:

1. "Is it possibles, or necessary, to obtain the quantity of distillate required by the 'Pharmacopœia?'"

2. "Is the specific gravity of spirit of nitrous ether, U. S. P., correctly stated?"

3. "Is the percentage of nitrous ether in the spirit of nitrous ether of the U. S. P. correctly stated?"

4. "Is the method of Br. Ph. for determining the percentage of nitrous ether in the spirit of that standard reliable within pharmaceutical limits, and can it be made available for the product of the U. S. P.?"

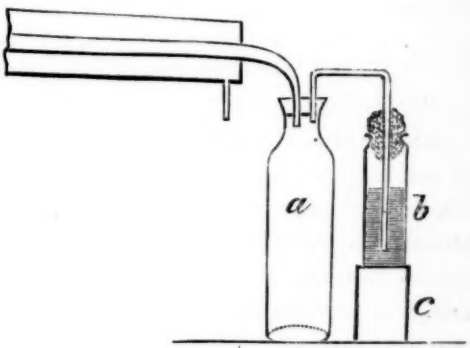
I. Is it possible, or necessary, to obtain the quantity of distillate required by the "Pharmacopœia?"

This question presented itself very forcibly when I prepared spirit of nitrous ether for the first time by the present process. I had conducted the process with extreme precaution, and assured myself that the condensing facilities were within the pharmacopœial requirements; the reaction proceeded with the regularity so characteristic of this process, and proper compensation had been made for the somewhat weaker than officinal acids used. Nevertheless I failed to obtain the quantity of first distillate required, notwithstanding that the heating was continued for some time after the reaction had ceased. On adding the second portion of nitric acid and heating as directed, the additional two fluidounces of distillate were readily obtained, making, with the first portion, a total distillate of a little over 9 fluidounces. But on mixing this with the reserved quantity of stronger alcohol, presented by the "Pharmacopœia," a spirit of nitrous ether was obtained, which corresponded in all its characters to the officinal spirit, with the single exception: that *its specific gravity was* 0·822 instead of 0·837. Not having at the outset any reason to doubt the correctness of the pharmacopœial requirements, this first operation was not conducted as an experiment, and, consequently, no record of temperature, progress of distillation, etc., was kept; but with these results before me, I resolved at the next opportunity to conduct the process experimentally.

First Experimental Distillation.—A slight odor of nitrous ether having

been perceptible in the room during the previous distillation, probably owing to a small opening which had been purposely left in the receiver; in this and the subsequent distillation the receiver was provided with a small glass tube, bent twice at right angles, and dipping into alcohol contained in a vial loosely stopped with cotton and resting on a support a little higher than the column of alcohol. The arrangement is shown in the accompanying cut.

By this arrangement the loss of ether was completely prevented, the temperature of the water flowing through the condenser being 58° F., while the temperature of the room did not exceed 65° F. at any time. The alcohol was of the proper strength (sp. gr. 0·817) and neutral; the nitric acid had the sp. gr. 1·365 (=63·5 per cent. $HONO_5$); the sulphuric acid the sp. gr. 1·830 (=93 per cent. $HO\,SO_3$); the copper was in thin sheets, and cut into small pieces. Proper compensation having been made for the weaker acids used, the process was conducted as officinally directed, with this exception, that, for want of time, the mixture of alcohol and sulphuric acid was allowed to stand several days before commencing the distillation.



a. The receiver, rather tall, which is connected, air tight, with a Liebig's condenser.
b. The absorbing bottle, containing a measured quantity of stronger alcohol.
c. The support, the removal of which prevents the return of the contents of the absorbing bottle into the receiver, in case of condensation occurring in the retort by cooling.
a is closed by a cork stopper.
b is closed by cotton.

First Heating. Commenced at 9.30 A.M., temp. 62° F.; commenced to simmer at 9.41 A.M., temp. 143° F.; heat removed when temp. was 152° F.; rose spontaneously to 165° F.; at 10 A. M. temp. commenced to fall, heat again applied; at 10.25 the temp. was 170° F.; at 10.35 the reaction slackened, temp. 176° F., heat increased; at 10.42 the distillate passed, drop by

drop, and the reaction had ceased, temp. 180° F.; the retort was now allowed to cool. *Yield of distillate*, 6⅞ *fluidounces.*

Second Heating. Added the reserved portion of nitric acid at 12.35 P.M., temp. 90° F.; commenced to simmer at 140° F.; at 12.57 the temp. was 170° F.; at 1.25 the distillation was ended. *Yield of distillate*, 2 *fluidounces.*

Into the absorbing bottle 6 fluidounces of alcohol had been placed. After the conclusion of the process this measured 6⅞ fluidounces, showing an *additional yield of* ⅛ *fluidounce*, and making a *total yield of* 9½ *fluidounces of distillate.*

The reaction proceeded with the utmost regularity, and the end was characterized by the sudden disappearance of the abundant frothy ebullition, followed by gentle simmering for a short time. Upon diluting the distillate with the reserved quantity of stronger alcohol, a spirit was obtained which, like the first, correspond with the officinal requirements in every respect, except in its sp. gr., *which was* 0·8225 *at* 60°F.

Second Experimental Distillation.—It was observed in the previous operations that, after the reaction ceased, if the temperature was maintained at 180°F., distillation would proceed drop by drop. It was therefore resolved in this experiment to continue the heating until the pharmacopœial quantities of distillate had been obtained. It had also been suggested to me that if more sulphuric acid was added after the reaction, an additional quantity of distillate might be readily obtained. For this reason an ounce of sulphuric acid was added after the first heating with the result below indicated. As in the previous operation, the acids were somewhat weaker than officinal in this instance, and correspondingly larger quantities were used. The nitric acid had a sp. gr. of 1·372 (=64·5 per cent., $HONO_5$); the sulphuric acid was of sp. gr. 1·838 (=95 per cent., $HOSO_3$); the alcohol was of sp. gr. 0·817, and neutral; the copper was in thin sheets. With a view of obtaining absolutely true measures, the volume of alcohol necessary was obtained by measures of weight instead of measures of capacity, the fluidounce being taken at 372·216 grains, that of water weighing 455·669 (Pile's average, "U. S. Dispensatory," 13th edit., 1735). The mixture of sulphuric acid and alcohol was made in the evening, and the distillation commenced next morning, the temperature of the room ranging between 60° and 65°F., that of the condensing water being 56°F.

First heating:

11.25	A.M.,	heat applied to water-bath.	Temperature,	62° Fahr.
11.47	"		"	100° "
12.4	P.M.,	commenced to simmer.	"	150° "
12.6	"	reaction energetic; turned down gas.	"	160° "
12.10	"		"	168° "
12.13	"	turned gas higher.	"	168° "
12.23	"		"	170° "
12.30	"		"	175° "
12.40	"	turned down gas; distillation drop by drop.	"	180° "
12.50	"	allowed to cool.	"	178° "
1.45	"	*amount of distillate* 10½ *fl. oz.*	"	90° "

Second heating (with one ounce of sulphuric acid added):

2.18	P.M.,	applied heat.	Temperature,	80° Fahr.
3.7	"	no reaction; distillation drop by drop.	"	180° "
4.45	"	*amount of distillate* 1 *fl. oz.*	"	90° "

Third heating (with reserved portion of nitric acid):

4.47	P.M.,	applied heat.	Temperature,	90° Fahr.
4.55	"	commenced to react briskly, and for the first time some vapors passed through absorbing bottle.		
5	"	the reaction was over.	"	180° "
6	"	*total distillate* 13 *fl. oz.*		
9.25	"	*the requisite quantity of distillate,* 15 *fl. oz., obtained.*		

The 15 fluidounces of distillate, when diluted to the proper volume with stronger alcohol, corresponded in its odor, color and taste, in its relation to litmus, to bicarbonate of potassium, and to heat, in its boiling point, and in its freedom from aldehyd (relation to solution of potassa), to the officinal requirements, but *its sp. gr. was only* 0·825 *at* 60° *F.*

If we now review the foregoing experiments we find that the only deviations from the officinal directions consisted in the use of weaker acids in proportionately larger quantities, and in the substitution of thin sheet-copper for copper wire. By the use of weaker acids, it is true, a portion of water is introduced, but this can have no influence on the reaction if we accept Prof. Redwood's experiments, and consequently the process of the Br. Ph. to be correct, since, in the latter process, the relation of water to monohydrated acids and absolute alcohol is much greater than in the U. S. process (see table D). It is hardly probable that the substitution of thin sheet-copper for copper wire can have any

influence on the reaction, and we must, therefore, look for some other cause for the disparity in the quantity of distillate. This, I now believe, to be owing to the temperature at which the reaction is allowed to take place. It will be noticed that in the first experimental distillation the heat was removed when the thermometer indicated 152°F. This was done because the reaction was quite energetic, as evidenced by abundant frothy ebullition, and because the "Pharmacopœia" directs caution in the application of heat. It was expected that the temperature would rise spontaneously to near the limit designed by the "Pharmacopœia;" but instead it rose only to 165°, and heat had subsequently to be kept up until the reaction was completed.

It the second experimental distillation the heat was never completely removed, but at 160°F. the gas flame heating the water-bath was turned low, upon which the temperature rose to 168°F., and there remained stationary for some time, until the heat was again increased. Now this slight difference in the heating appears to have had a remarkable effect in increasing the volume of distillate; for, while by the first heating of the first experimental distillation only $6\frac{3}{8}$ fluidounces of distillate were obtained, the time required being 1 hour and 12 minutes; the yield of the first heating of the second experimental distillation, time 1 hour and 25 minutes, was about $10\frac{1}{2}$ fluidounces. Furthermore, on consulting the directions of the Br. Ph., it will be observed that the distillation is to be conducted "at a temperature commencing at 170° and rising to 175°, but not exceeding 180°." This rather unfortunately worded direction, can only mean that the heat is to be applied until the temperature reaches 170°, and that it is then to be checked, when it will rise spontaneously to 175°. As Prof. Redwood undoubtedly readily obtained the required quantity of distillate, any disparity in the quantity of distillate must be due to the temperature at which the reaction is allowed to take place, and that this view is correct is further confirmed by the results of Alfred E. Tanner,[1] who, following the process of the Br. Ph., obtained only 11 fluidounces of total distillate; but he had deviated from the officinal directions by distilling "at a temperature commencing at 160°, and rising to 175°."

Mr. Tanner found, however, that the 11 fluidounces of distillate obtained contained the full officinal quantity of nitrous ether, and this

[1] "Am. Jour. Phar.," Feb, 1871, p. 82, from "Phar. Jour. and Trans."

I believe to be true also for the smaller quantities of distillate obtained in my experiments, since the spirits made with them corresponded very closely with the product of the second experimental distillation, and all of them corresponded with the officinal spirit in every character, except specific gravity. The question now properly arises, how or in what manner the temperature affects the volume of distillate without at the same time affecting the quantity of ether? This also permits of easy explanation. In both processes a very large excess of alcohol is used (see tables D and E). The formation of nitrous ether takes place as readily at the lower as at the higher temperature, but at the higher temperature the reaction is more violent, and, being also much nearer the boiling point of alcohol, a relatively larger quantity of the alcohol, not necessary to the reaction, is carried over.

The first question may therefore be answered as follows:

1. *It is possible to obtain the quantity of distillate required by the "Pharmacopœia." Whether this is possible without unnecessarily long-continued heating, as in the instance of the "second experimental distillation," is not decided by the above experiments, but seems probable.*

2. *It is not necessary to obtain the full quantity of distillate required by the "Pharmacopœia." If the reaction takes place at a lower temperature the yield is smaller, but the etherification is complete and the distillate more concentrated than at a higher temperature, at which a correspondingly larger quantity of undecomposed alcohol is carried over with the ether vapor.*

II. Is the specific gravity of spirit of nitrous ether, U. S. P., correctly stated?

The "Pharmacopœia" states that: "Spirit of nitrous ether has a specific gravity of 0·837." On looking over the "Journals," I find that only two experimenters, Oakley Griggs[1] and Geo. W. Kennedy,[2] have recorded the specific gravity of nitrous ether obtained by them since the publication of the present "Pharmacopœia," but neither of them gives the details of the process as carried out. The sp. gr. of Mr. Griggs' product is stated to be 0·834; that of Mr. Kennedy's, 0·835. I have already stated that the three products obtained by me corresponded in all their characters with the officinal requirements, except in their specific gravities: the product of the first distillation

[1] "A. J. Ph.," Oct., 1875, p. 463. [2] *Ibid.*, June, 1876, p. 259.

having the sp. gr. 0·822; of the first "experimental" distillation, 0·8225; of the second "experimental" distillation, 0·825. With these results before me, I naturally began to inquire into the correctness of the pharmacopœial statement, when it soon became evident that, unless great condensation occurs by the solution of nitrous ether in stronger alcohol, the statement of the U. S. P. must be based on error.

The "Pharmacopœia," after giving the specific gravity of the spirit, states that it "contains 5 per cent. of its peculiar ether." Without pausing to consider whether this statement is correct or incorrect, and assuming it to be true for *pure ether*, the question arises, whether the percentage given is meant to be percentage by weight or percentage by volume. Neither the "United States Dispensatory" (13th ed.) nor "Parrish's Pharmacy" (4th ed.) throw any light on this point. The "British Pharmacopœia," however, states of its own preparation: "If it is agitated with twice its volume of saturated solution of chloride of calcium, in a closed tube, 2 per cent. of its original volume will separate in the form of nitrous ether, and rise to the surface of the mixture." It does not say that the preparation should contain 10 per cent. of nitrous ether; but one of the editors of "Pareira's Materia Medica" (abridged ed., 1872), probably Prof. Redwood, commenting on the process, says: "The separation of 2 per cent. of nitrous ether indicates the presence of *about* 10 per cent. of nitrous ether, 8 per cent. remaining dissolved in the mixture." It is, therefore, safe to assume that the U. S. P. intends to indicate volume and not weight per cent.[1]

If, then, spirit of nitrous ether is composed of 5 per cent., by volume, of absolute nitrous ether, sp. gr. 0·947, and 95 per cent., by volume, of stronger alcohol, sp. gr. 0·817, what should be its sp. gr., if no condensation occurs?

5 volumes of nitrous ether, sp. gr. 0 947, weigh	4·735 parts,
95 volumes of stronger alcohol, sp. gr. 0·817, weigh	77·615 parts,
100 volumes of spirit of nitrous ether weigh	82·350 parts,

indicating a specific gravity of 0·8235, which, while totally at variance with the "Pharmacopœia," corresponds very nearly to the specific gravities obtained by me.

[1] Since writing the above I have had opportunity to consult the latest (14th) edition of the "United States Dispensatory," in which (page 1445) I find the following statement: "The sweet spirit of nitre obtained by the old formula was estimated to contain 4 per cent. *in volume* of nitrous ether.

If we now apply the same rule to the product of the "British Pharmacopœia," we obtain results which very nearly correspond to the statement of that standard. In this process rectified spirit of sp. gr. 0·838 (see Table B) is used, while the finished product contains 10 per cent. of nitrous ether and has a specific gravity of 0·845 (see Table F):

10 volumes of nitrous ether, sp. gr. 0·947, weigh	9·47 parts,
90 volumes of rectified spirit, sp. gr. 0·838, weigh	75·42 parts,
100 volumes of spirit of nitrous ether weigh	84·89 parts,

indicating a specific gravity of 0·8489; a result which corresponds sufficiently close when it is considered that the "British Pharmacopœia" does not positively claim 10 per cent. of absolute nitrous ether in its preparation.

It is evident from these results that if the sp. gr. of the British preparation is correct, that of the United States preparation must be wrong; and this becomes more apparent when we review the increase in ponderability over the respective alcohols used in the two processes, as shown in the Table G; for, while 1000 volumes of the British product weigh but 7 parts heavier than the alcohol used for its preparation, being 0·7 parts for each one per cent. of nitrous ether, 1000 volumes of the product of the U. S. P. would, if the sp. gr. is correctly stated, weigh 20 parts heavier than the alcohol used for its preparation, or 4·0 parts for each one per cent. of nitrous ether it is claimed to contain.

It remained then to determine whether any condensation results on the admixture of the distillate in the alcohol. For this purpose the distillate obtained by the second experimental distillation was used. This, which at 60° F. measured 15 fluidounces, and weighed 5974·5 grains, was mixed with 17 fluidounces of stronger alcohol, sp. gr. 0·817, weighing 6328·5 grains. One fluidounce of this mixture, at 60° F., should weigh, if no condensation occurs, 384·5 grains, and by dividing this weight by the weight of a fluidounce of water (455·669 grains) we at once obtain the specific gravity:

455·669 : 384·5 :: 1 : 0 843, *the calculated specific gravity of the concentrated spirit.*

In order to reduce the "concentrated spirit" to the volume required by the "Pharmacopœia," 72 fluidounces of stronger alcohol are required, or 2·34375 fluidounces to 1 fluidounce of "concentrated spirit." The weight of a fluidounce of a mixture so made should, at

60° F., be 376 grains. By dividing this weight by that of a fluidounce of water we again obtain the correct specific gravity, if no condensation has occurred:

455·659 : 376 :: 1 : 0·825, *the calculated specific gravity of the spirit of nitrous ether.*

Upon now taking the specific gravities of these two spirits, by the aid of an accurate 1000-grain bottle, they were found to tally exactly with the calculated specific gravities:

The concentrated spirit, at 60° F., weighed 843 *grains,*
The spirit of nitrous ether, at 60° F., weighed 825 *grains,*

indicating specific gravities respectively of 0·843 and 0·825, and proving that *no condensation occurs when alcohol and nitrous ether (in concentrated solution) are mixed.*

The second question may therefore be answered as follows:

1. *The specific gravity of spirit of nitrous ether, U. S. P., is not correctly stated.*

2. *Its specific gravity, if it contains* 5 *per cent. of pure nitrous ether, should be* 0·8235.

3. *In the experiments made the specific gravity varied between* 0·822 *and* 0·825.

III. Is the percentage of nitrous ether in the spirit of nitrous ether of the "Pharmacopœia" correctly stated?

The discovery of the error in the pharmacopœial statement of the specific gravity prompted me to inquire into the correctness of the statement of the strength of the spirit of nitrous ether. The "Pharmacopœia" states very positively that it "contains five per cent. of its peculiar ether." In the Table H it has already been foreshadowed that this cannot be true, if by "its peculiar ether" it is meant to designate "absolute nitrous ether," and this is plainly demonstrated by the following calculation:

4½ troyounces (= 2160 grains) of nitric acid, sp. gr. 1·42, contains 1620 grains (= 75 per cent.) $HONO_5$.

63 grains of $HONO_5$ are capable of forming 75 grains of $C_4H_5ONO_3$, and, consequently, 1620 grains of $HONO_5$ can form 1928·5 grains of $C_4H_5ONO_3$.

The specific gravity of absolute nitrous ether is stated to be 0·947; consequently a fluidounce of nitrous ether, at 60°F., will weigh

431·518 grains (water weighing 455·669 grains), and 1928·5 grains of nitrous ether will, therefore, measure 4·469 fluidounces, which, being contained in 107 flouidounces of finished spirit of nitrous ether, gives a *possible quantity* of absolute nitrous ether in the spirit of the U. S. P. of 4·1766 *per cent.*

I am not disposed to quarrel with the revisors of the "Pharmacopœia," but cannot help thinking that a more careful perusal of the original paper of Prof. Redwood would have prevented this error. Speaking of the 15 fluidounces of distillate obtained by the process, Prof. Redwood says[1]: "This product consists of a strong spirituous solution of nitrous ether containing thirtyfive per cent. of *crude ether*;" and further on, when speaking of the finished product: "If it be mixed with twice its volume of a concentrated solution of chloride of calcium, *from two to three per cent.* of nitrous ether will separate and rise to the surface of the liquid. This indicates the presence of ten per cent. of ether, as eight per cent. remains unseparated." In no portion of his paper does Prof. Redwood claim that he has operated with, or obtained, absolute nitrous ether; but, speaking of crude ether in connection with the percentage in the distillate, it is fair to assume that crude ether is also meant when speaking of the percentage separated from, and contained in the finished spirit. Indeed, if the 15 fluidounces of distillate contain 35 per cent. of crude ether, the finished spirit made from it—55 fluidounces—can not contain quite 10 per cent. of crude ether, as is shown by the following calculation:

15 fluidounces of distillate contain 35 per cent., or 5·25 fluidounces of crude ether; consequently this quantity is contained in 55 fluidonnces of the finished spirit. Then

55 : 5·25 :: 100 : 9·945,

proving that according to Prof. Redwood's own showing the finished spirit can only contain 9·945 per cent. of crude ether.

I do not intend in the present paper to inquire into the composition of "crude nitrous ether," within the meaning of Prof. Redwood, such an inquiry requiring an amount of research for which I have no leisure. It is an established fact, that by any and all methods that have hitherto been proposed, it is extremely difficult to obtain pure and absolute nitrous ether, and it is hardly probable that Prof. Red-

[1] "Am Jour. Phar.," July, 1867, p. 331.

wood's modification of Kopp's process should constitute an exception. To the contrary, I think it probable that small proportions of by-products are formed, and am strengthened in this view by the observation, that the final distillate of the second experimental distillation, passing after the reaction was over, and being colorless, had a decided odor of formic ether.

I would, therefore, answer the third question as follows: 1. *The pharmacopœial statement, that spirit of nitrous ether contains five per cent. of "its peculiar ether" is not correct, if, by "its peculiar ether" absolute nitrous ether is understood.*

2. *Conceding that all of the nitric acid, used in the process, is consumed in forming nitrous ether (and all testimony is in favor of this view), the spirit of nitrous ether of the U. S. P. can not contain more than* 4·1766 *per cent. of absolute nitrous ether—*$C_4H_5ONO_3$.

IV. Is the method of the "British Pharmacopœia," for determining the percentage of nitrous ether in the spirit of that standard reliable within pharmaceutical limits, and can it be made available for the product of the U. S. P.?

In the foregoing it has been shown, that the "Pharmacopœia" is in error in some of its definitions of the character of spirit of nitrous ether, but that as regards the process, it is in the main correct. The only point in regard to the latter that still remains in doubt, as far as my experiments are concerned, is the yield of distillate; and while it seems probable, from what has been said, that the full quantity of distillate can be readily obtained, a final experiment can alone determine this satisfactorily. That the process itself is a good one admits of no doubt. It is readily executed and, if due precautions are observed, all of the nitric acid used is represented in the product as nitrous ether. Nevertheless it is desirable that some controlling test should be applied to the product, since, under ordinary conditions, a portion of ether may be lost, and the spirit become correspondingly deficient. It occured to me, therefore, to determine if the method of the "British Phamacopœia" for determining the strength of its spirit was sufficiently reliable, and, if so, how it could best be applied to the product of our "Pharmacopœia." This method has already been alluded to, and is based upon the fact, that when an alcoholic solution of nitrous ether is

agitated with twice its volume of a concentrated solution of chloride of calcium, a certain portion of ethereal liquid will rise to the surface if the spirit contains over eight per cent. of nitrous ether. Prof. Redwood states that under these circumstances eight per cent. of nitrous ether will remain in solution, but, as I have already had occasion to mention, he evidently means *crude nitrous ether*, *i. e.*, such ether as will rise to the surface of the above mentioned mixture; and that the separated ether is not absolute nitrous ether I have determined by the specific gravities of several samples, separated by the method of the "British Pharmacopœia," which ranged between 8·878 and 0·890.[1] Now, while it has been proved that the spirit of nitrous ether of the U. S. P. can not contain five per cent. of absolute nitrous ether, it seemed more than probable that it might contain five per cent. of such crude ether as is separable under the above-named conditions; and that this is so, is readily shown by the following results, obtained with a portion of the "concentrated spirit"—*i. e.*, the 15 fluidounces of distillate, diluted to 32 fluidounces with stronger alcohol:

1. It was calculated that if the spirit of nitrous ether contained five per cent. of such crude ether, the concentrated spirit should contain 16·82 per cent. On agitating 10 cc. of the concentrated spirit with 20 cc. of saturated solution of chloride of calcium, B. P., 0·85 cc. of ethereal liquid separated, indicating 16·5 per cent. of crude ether.

2. If in the above experiment eight per cent. of crude ether

[1] In the "United States Dispensatory," 13th ed, (1870), p. 1405, after quoting from the "British Pharmacopœia" the volumetric test for determining the strength of its spirit of nitrous ether, the following remarkable statement is made: "This indicates a strength considerably less than that of the U. S. spirit," and on page 1447 of the recent (14th) edition of the same work, this statement is repeated. A careful revision of the work should have prevented the repetition of an error, which a simple comparison of the two processes would have made evident, and which is all the more serious because the work is used as a text-book by beginners.

But the most astonishing error, in this connection, will be found in "Parrish's Treatise on Pharmacy," 4th ed. (1874), p. 373. It is here stated: "The strength of this spirit" (referring to the product of the U. S. P.) "may be ascertained by putting a small quantity in a test-tube, mixing with it double its bulk of a saturated solution of chloride of calcium, and shaking together. If one per cent. of ether rises to the surface, it will be evidence that it contained five per cent, as but one-fifth of the ether is set free by this experiment." The revisor of this work evidently failed to give this subject that careful attention, which a work, designed for students, imperatively demands.

remained in solution, then, upon diluting the concentrated spirit with fractional portions of stronger alcohol, the volume of crude ether separated should be correspondingly reduced. That this is the case is shown in the following table:

Quantity of concentrated spirit used. cc.	Quantity of stronger alcohol added. cc.	Quantity of satur't'd sol. chloride of calcium used cc.	Calculated Results.		Actual Results.	
			Volume of crude ether. cc.	Percentage of crude ether.	Volume of crude ether.	Percentage of crude ether.
10·0	. . .	20·0	0·882	16·82	0·850	16·50
7·5	2·5	20·0	0·437	12·37	0·450	12·50
6·0	4·0	20·0	0·190	9·90	0·200	10·00
5·0	5·0	20·0	0·025	8·25	0·050	8·50

These results are satisfactory evidence that the product of the U. S. P. may contain five per cent. of "crude nitrous ether," and that when a sufficiently concentrated alcoholic solution of nitrous ether is agitated with two volumes of saturated solution of chloride of calcium, B. P., eight per cent. of such crude ether as is separated from the surface remains in solution. It becomes evident, also, that if the distillate of the U. S. P. is not diluted beyond one-half of the full quantity of spirit intended to be obtained, the method may be applied to secure a uniform product.

There remained one other point to be determined in connection with the test of the Br. Ph., *i. e.*, in what respect any accidental deviation in the strength of the solution of chloride of calcium may affect the result. The well-known hygroscopic character of chloride of calcium, and the tenacity with which it retains water, make it difficult to obtain and retain the salt uniformly of the same composition. The Br. Ph. states that chloride of calcium "may be formed by neutralizing hydrochloric acid with carbonate of lime, adding a little solution of chlorinated lime and slaked lime to the solution, filtering, evaporating until it becomes solid, and finally drying the salt at about 400°." Four ounces (avoir.) of this salt, dissolved in five fluid ounces (Imp. meas.) of distilled water, constitute the saturated solution of chloride of calcium of the Br. Ph. It is evident, that according to the greater or less care observed in the preparation and preservation of the salt, the solution will vary in the absolute quantity of CaCl contained in it, and,

since the process can be of value, and is likely to be applied generally only, if it can be conducted with ordinary skill and care, it seemed desirable to determine in what respect fractional dilutions of the solution, beyond those likely to occur from the causes named, would influence the test. Accordingly, separate portions of "concentrated spirit" were agitated with solution of chloride of calcium, which had been diluted with different proportions of water, the results being shown in the following table:

Quantity of sat. sol. CaCl. used. cc.	Quantity of water added. cc.	Quantity of concentrated spirit used. cc.	Volume of crude ether separated. cc.	Percentage of crude ether indicated.
20·0	. . .	10 0	0·85	16·5
17·5	2·5	10·0	0.90	17·0
15·0	5·0	10·0	0·95	17·5
10·0	10·0	10·0	1·05	18·5

It will be observed that a dilution of the saturated solution of chloride of calcium has the effect of increasing the quantity of crude ether separated, an effect which, while not anticipated, is easily accounted for by the sparing solubility of nitrous ether in water. It is remarkable, also, that the increase in the quantity of ether separated is in direct and regular proportion to the degree of dilution, being 0·5 per cent. for each 12·5 per cent. of water introduced. When we take into consideration, however, that an error of 0·5 per cent. in a concentrated spirit of the above strength would be reduced to an error of 0·117 per cent. for the finished spirit, we may safely conclude that the trifling quantity of water introduced by a possible variation in the chloride of calcium prepared with ordinary care, cannot in any way affect the test.

In reply to the fourth question I would therefore say:

1. *The method of the "British Pharmacopœia" for determining the strength of its spirit of nitrous ether is correct and reliable, if by the percentage of nitrous ether indicated such "crude ether" is understood as will separate upon the application of the test.*

2. *The test is not materially affected by a slight variation in the strength of the saturated solution of chloride of calcium so called; but if the solution*

is unduly dilute, the volume of "crude ether" separated is increased 0·5 *per cent. for each* 12·5 *per cent. of water present in excess.*

3. *The method of the "British Pharmacopœia" can be applied to the product of the U. S. P., and will secure uniform results. To this end the distillate is brought to measure not over one-half the expected quantity of spirit* (32 *fluidounces is a convenient quantity*); *this is tested according to the directions of "British Pharmacopœia," and is then fnrther diluted with* 19 *volumes of stronger alcohol for each* 1 *volume indicated in excess of five per cent.*

At a future distillation it will be my aim to repeat some of the foregoing experiments, and especially to determine whether rapid heating to 170° F. will insure the full quantity of distillate required by the "Pharmacopœia" without inconveniently prolonged heating.

Louisville, June, 1877.

GLEANINGS FROM THE FOREIGN JOURNALS.

BY THE EDITOR.

Elixir of Monobromated Camphor.—J. Munday has modified his previous formula (see p. 176), because the glycerin has not sufficient sweetening properties to overcome the nauseous taste. He now proposes to mix spirit of cinnamon (1 in 50) ʒxv, red elixir (Amer. Phar. Assoc.) ʒxx and syrup q. s., to make ℥v, and dissolve, by the aid of a water-bath, monobromated camphor ℈i. Each half-ounce contains 2 grains.

Elixir Camphoræ Monobromatæ Comp., which is often prescribed in Paris, is made by dissolving butylchloral gr. iii in spir. cinnamon ℥iss, mixing the solution with tinct. gelsemium ♏x, red elixir ʒiss and sufficient syrup to make ℥ss, and dissolving therein 2 grains of monobromated camphor.—*Phar. Jour. and Trans.*, April 7.

Chrysophanic acid ointment has been recommended by Mr. Balm. Squire, in place of Goa powder, in the treatment of ringworm, psoriasis and other skin diseases. To prepare it, he recommends to dissolve 2 drachms of the acid and 1 oz. of lard in the smallest necessary quantity of benzol, using a small beaker, placed in a water-bath, and when the solution has been effected, to promptly transfer it to an evaporating dish placed in cold water, stirring briskly until the solution has become fully and firmly "set"; the benzol evaporates readily, and a uniform

and smooth ointment is obtained, entirely free from grittiness.—*Ibid.*, Dec. 16, 1876.

Antihydropin is the name given by Dr. Bogamolow to a crystalline principle which he obtained from cockroaches, *Blatta orientalis*, L., and which he has used with success in six cases of dropsy, for which the cockroaches in Russia are valued as a popular remedy. Dr. Bogamolow has used them in the form of powder, tincture and decoction, and observed that the quantity of urine is augmented, and albumen, if present, decreased; the œdema of hands, feet and face subsides rapidly, the weight of the body is diminished and perspiration increased. The remedy does not disturb digestion, nor, like cantharides, irritate the kidneys.—*Phar. Zeitsch. f. Russl.*, 1876, p. 689.

Hashish of Central Asia, according to Dr. Preobraschensky, is met with in the bazaars of the larger towns in the form of flat cakes 5 to 15 inches long, 5 to 10 inches wide and 1 to 3 inches thick, is externally dark-brown, internally greenish or brownish, hard and tough, breaks with difficulty, but may be readily cut into thin pieces, particularly after being warmed. The resin is collected in the spring from the flowering tops, and kneaded with sand and water into a plastic mass, which is dried upon a clay floor until just hard enough to be cut into cakes. These are called *nasha* by the Bucharians, and *hashish* by the Russians, and are exported from Bucharia to Chiwa, Tashkent, Kokant and other places.

The author has subjected this hashish to an analysis, in the course of which he obtained resin of a balsamic tolu-like odor, a portion of which is insoluble in water; a colorless volatile oil of a camphoraceous and terebinthinate odor, and a warm and, at the same time, cooling, aromatic and bitterish taste; and a volatile alkaloid, which in odor, taste, the crystallization of the salts, and in its reactions with platinic chloride and Mayer's test, corresponds with *nicotina*. By titration with sulphuric acid, amounts of nicotina varying between ·0106 and ·02223 gram for 100 grams of hashish were found. By incineration, hashish yielded 50 per cent. of ashes.

Nicotina was also obtained from the tops of Indian hemp.—*Ph. Zeitschr. Russl.*, 1876, p. 705–714.

Volatility of Glycerin and Nitroglycerin.—Hager has found (1875) that glycerin volatilizes slowly at the ordinary temperature when

it is exposed to a dry atmosphere in thin layers or mixed with a bulky powder. Hess reports a similar observation for nitroglycerin. He found in 1871 a dynamit to contain 72·98 per cent., but after having been kept for five years, only 69·36 per cent. of nitroglycerin.—*Phar. Centralhalle*, No. 12.

To Remove Odorous Compounds from Mortars, Glassware, etc.—Schneider recommends to wash them with ground mustard and some water. A. Huber finds that ground flaxseed, almonds and other oily seeds have the same effect. The odor of musk, valerian, phenol, etc., is thereby readily removed. A little hot benne or olive oil is very serviceable for the cleaning of fish-oil bottles.—*Schweiz. Wochenschr*, No. 13.

Use of Clothes Wringers in place of Presses.—E. Dietrich states in "Apotheker Zeitung" that he has been using cloth wringers for over a year and prefers them to the presses usually employed, in which the margin of the presscake always retains a portion of the liquid. By straining tinctures, infusions, decoctions, etc., through a bag, and passing the latter through the wringer, all the liquid will be easily separated, without coming in contact with the hands. Pulp of tamarind, etc., may be rapidly made and with the use of little water, by passing the material first through a coarse hair sieve, and afterwards, enclosed in a suitable bag, through the wringer.

Modified Percolator.—Mr. B. S. Proctor suggests the addition to the usual cylindrical tube and receiver, of a cylinder of tin plate or other suitable material, closed at both ends, fitting loosely within the percolation tube, the object being to get a slightly increased hydrostatic pressure with a small quantity of the solvent. The cylinder floats in the liquid, and the space besween it and the percolator being narrow, a head of 6 or 8 inches is obtained with a small quantity of liquid.—*Phar. Jour. and Trans.*, Feb. 3.

Caustic soda containing oxide of zinc has been observed by J. J. J. Kyle. The article, which was marked "chemically pure," had been obtained from a Paris manufacturer. On passing sulphuretted hydrogen through the solution with the view of converting it into sulphide of sodium, a white precipitate was obtained, which proved to be sulphide of zinc. It had been, probably, prepared by Hunt's process from sulphide of sodium and oxide of zinc with too large a

quantity of the latter, so that the soluble compound of soda and oxide of zinc was formed.—*Revista farmac.* (*Buenos-Aires*), Feb.

Impure Acid Sulphite of Sodium.—Of six samples of this salt sold as being "pure for analysis," W. F. K. Stock has found five to contain different and notable quantities of hyposulphite.—*Chem. News*, March 29.

Iodide of Starch as an Antidote to Poisons.—Dr. Bellini has read a paper before the Medical Society of Florence, Italy, in which he recommends iodide of starch as an antidote which admits of very general application in cases of poisoning, more particularly when the result of alkalies, alkaline or earthy sulphurets, or of alkaloids. The preparation is easily administered in large doses, has not the irritating properties of free iodine, and readily forms with the substances named either harmless or insoluble compounds. To avoid the subsequent decomposition of the latter, its administration may be followed by an emetic.—*Rép. de Phar.*, 1877, p. 17.

Protiodide of Mercury.—Mr. Le Canu, of Caen, recommends to prepare mercurous iodide by triturating 5 grams of mercury with about 20 drops of alcohol until the mercury is finely divided, adding, if necessary, a little alcohol to replace that which may have evaporated. Three grams of iodine are now added, in small portions, and the whole triturated as rapidly as possible. The finely divided mercury rapidly combines with the iodine, any biniodide formed is almost instantly reduced, and at the end of 10 to 20 minutes a very pure mercurous iodide is obtained without the necessity of washing with alcohol.—*Ibid.*, 139—141.

Lunar caustic is occasionally ordered by physicians, diluted with a certain amount of potassium nitrate, also in sticks of a given diameter. Where metallic moulds are not available, they may be substituted by a hollow cylinder made of parchment paper, with the edges secured by means of mucilage. These moulds may be placed into an ordinary test tube, and when the mass has solidified, the paper may be removed, the stick being quite white.—*Schweiz. Wochenschr. f. Phar.*, No. 7.

A. Huber draws the fused mass carefully into glass tubes of the proper diameter, so as to avoid the formation of air cavities; after the mass has solidified, the glass tube is heated over a spirit or gas lamp,

until the surface of the silver salt becomes soft, when the stick may be easily pushed out with a wire.—*Ibid.*, 13.

Mich. Schlesinger did not succeed with parchment paper, which took fire, (was the fused mass too hot?)—*Phar. Centralhalle*, No. 14.

Preparation of Pyroxylon.—To obtain gun cotton perfectly soluble in ether, Mr. Goddefroy recommends a mixture of 20 parts of sulphuric acid and 10 parts of potassium nitrate, into which at a temperature of 56°C (132·8°F.) 1 part of cotton is introduced and kept for seven minutes. The cotton should be previously freed from fat by boiling with solution of sodium carbonate containing a little potassa, and afterwards washing with water.—*Zeitschr. Oest. Apoth.Ver.*, No. 13.

NOTES ON THE PERMANENT EXHIBITION.

BY THE EDITOR.

I.

The main building of the Centennial Exposition has been arranged to accommodate the permanent international exhibition; though the latter cannot be expected to rival the former in splendor and variety, yet it contains so much of interest to the pharmacist, druggist and physician, that a visit cannot fail to be instructive. We propose to publish notes on such articles as may be considered interesting to our readers, and as occasion offers, to refer also to similar articles which were on exhibition last year, with the view of rendering the account more complete.

Passing in through the western entrance, the eye is attracted on the north side of the nave by diverse collections of spices and manufactures in which they are used. Among them we find the fruit of *Theobroma Cacao*, Lin., and also imitations of the same in chocolate. The tree and several closely allied species or varieties are natives of Central and South America, where they have been in cultivation at the time of the discovery of this continent. At present, not only has this culture been very materially extended, but the tree has also been introduced to the eastern hemisphere and is successfully cultivated in Liberia, Mauritius, the Seychelles and Java. In this connection we wish to refer to a work which was on exhibition last year, and though specially addressed to women, deserves to be more widely known, containing as it does, beautiful folio plates in chromo-lithography of Theobroma cacao, Musa paradisiaca, Mangifera indica, Garcinia mangostana, Butea frondosa, Anacardium occidentale and other well-known plants; the work is entitled "Fleurs, fruits et feuillages choisis de la flore et de la pomone de l'île de Java; par Madame Berthe Hoola van Nooten." It was published at Brussels, 1866, with the text in the English and French languages.

The preparation of the seed, the so-called chocolate nut, for the market requires much attention. The large indehiscent capsular fruit is collected when nearly or quite ripe, the seeds are carefully removed from a sweetish pulp and examined with the view of rejecting the unsound; they are then placed in heaps for a few days to

undergo a kind of fermentation, whereby the flavor is improved and the germinating power destroyed. In many places it is customary to put the fresh seeds into baskets or barrels and bury them in the ground for several days, whereby they acquire a deeper brown color and lose their harsh and bitter taste. Fruits which are not fully matured are not opened until after they have ripened by being placed in heaps and covered with leaves. The seeds prepared as stated are then rapidly dried in the sun or by artificial heat. The variations of the soil and climate, and the different modes of treatment, influence the size, color and other physical characters of the seeds, and to some extent also the formation of the fixed oils and other chemical constituents.

The varieties now on exhibition comprise mainly cacao from Trinidad, Caracas, Maracaibo and Liberia. At the Centennial Exposition Venezuela alone exhibited no less than twenty kinds of cacao, all of which probably appear in commerce only as five or six varieties, of which the three first named are perhaps the most important; nearly all the other cacao-producing countries had likewise sent specimens. We learned that its cultivation, though profitable, has of late years been neglected in Jamaica, so that now only about 600 cwt. are exported; on the other hand, it appears to be on the increase in Bahia, Amazonas, Para, Maranhao and other provinces of Brazil, but is not yet important enough as that cacao could be classed among the *principal* products of exportation from that country. The yield of cacao in Para is stated by Dr. Moreira for 1,000 trees, which can be taken care of by one man, to be annually 70 arrobas (of 32 lbs. each), and to continue for about 80 years. These figures are probably too high for an average; an annual yield of 50 arrobas and a productiveness for 40 or 50 years appear to be nearer correct. The rind of the fruit is said to be rich in potash and the ash to be available for soap-making. The pulp surrounding the seeds is used for preparing a refreshing drink, and also a kind of rum.

Cacao seeds have a brittle testa, which encloses an embryo of the same shape as the seed, and consists mainly of two large cotyledons, which are penetrated by the irregular projecting folds of the inner seed-coat, so that they readily break into angular pieces. The interesting alkaloid, *theobromina*, is contained not only in the kernel, but also in the shell (testa), which is used in a similar manner as coffee. The former is the seat of the *cacao-butter*, of which it contains between 38 and 51 per cent., and which melts at about 90°F (see p. 237). It is obtained as a by-product in the preparation of *cocoa* (more properly called *cacao*) and *chocolate*. The former is mainly the ground seeds, freed from their fixed oil by warm pressure; the latter is the seeds partially deprived of the oil, and made into a uniform paste with or without the addition of sugar, for the cheaper qualities, also, with farinaceous substances and animal fats, and variously flavored; the most delicate and generally acceptable flavor for chocolate is furnished by vanilla.

Vanilla is the fruit of *Vanilla planifolia*, Andr., a climbing orchidaceous plant, indigenous to Eastern Mexico, where, as well as in some other tropical countries, it is cultivated. The fruit is collected when the green color begins to change, and by subjecting them to a kind of sweating process the characteristic dark-brown color and delicate aroma is developed. The kind most highly esteemed in the United

States comes from Mexico; it is generally prefered to the Bourbon vanilla, which is usually covered with a crystalline efflorescence of *vanillin*, but has an odor reminding somewhat of Tonka. Vanilla is also produced at the Seychelles, to what extent we have not learned. The fruit resembles that of Mexico, but is considerably thinner. The vanilla of Costa Rica likewise resembles the Mexican, but is less attenuated at the ends, and like the Venezuelan vanilla, which is not over 4 inches long, has a decided flavor of tonka. Whether Vanilla pompona is also cultivated in Venezuela we cannot say, but a vanilla resembling the fruit of that species was lately offered as Laguayra vanilla. As grown in its native country, Brazil, it is nearly an inch broad, fleshy and of an inferior odor as compared with the best commercial varieties. The vanilla of Peru is probably from the same species, but when dry is of the thickness of a finger, and 6 or 7 inches long. The culture of vanilla in Jamaica has as yet not been attempted on a sufficiently extensive scale. To what extent the use of vanilla may be interfered with by the artificial production of vanillin from coniferin remains to be seen. That which was exhibited last year by Dr. Haarmann had a very fine flavor, which, in our estimation, resembled Bourbon vanilla rather than the Mexican.

VARIETIES.

The Mineral Waters of Greece.—There are few countries in Europe as rich in mineral waters as Greece. Very excellent thermal springs are found at Aidipso, in the island of Eubœa, and at Thermopyles, both of which were known in ancient times as Heraclian's warm waters. Warm springs are also found in the islands of Thermia and Kythnos, and springs of different compositions are met with in Mylos and Santorin. The Peloponnesus and Akarnania are likewise not deficient in these treasures. The hot saline springs of Lutraki, near Corinth, known from the remotest period, and the theiothermæ, or sulphur springs, being located in the former, while the latter has the far grander sulphur springs of Hypate.

It is to be regretted that at nearly all these places there are no establishments offering the desirable comfort to induce foreigners to visit the excellent springs of this classical country; not only the warm, but also the cold, which are found in various sections, and among which may be enumerated the many possessing aperient and purgative properties, and the lithontriptic waters of a monastery, near Hydra. The latter are alkaline, and have proved effectual in many cases of gravel and stone.

Marble.—One of the most important minerals of Greece, in ancient and modern times, is the white marble of the Pelikon Mountains, not far from Athens. Nearly all the ancient temples, the admirable Parthenon, the Propylæa and hundreds of statues were made of this marble, which has also furnished the material for the new Academy, the University and many palaces of modern Athens, as well as for numerous ornaments.

An excellent white marble, though difficult to transport, is also obtained from the island of Paxos. It was employed by Phidias and Praxiteles for their famous

sculptures, and was called Lychnites lithos, from λυχνος, a light or lamp, some authors asserting that the name was applied to it because it had to be quarried with the aid of lamps.

In many other places of Greece valuable marbles are found, of white, green, red, black and other colors.

Use of Sulphur.—Some years ago an argillaceous lamp, similar to those contained in ancient tombs, was found in the Akropolis, near the Parthenon. It had a wick of asbestos inserted in a substance, the nature of which was not difficult to tell, it being sulphur and had evidently been melted and ignited by the wick for making fumigations in honor of Minerva.

It is singular that the Greek name for brimstone is *theion*, while God is *theos*, and so the name of brimstone, *theion* signifies divine, godly.

In another lamp I have found a mass which consisted of different resinous substances, such as labdanum, myrrh, olibanum and storax, materials which were generally used for making the so-called urnresin.

Ancient Colors.—The inalterableness of the colors of the ancient Greeks has always attracted the attention of scientific men. From chemical investigations made a number of years ago, I am convinced that all these colors are of mineral origin. Red ocher, red lead and vermillion were the principal red colors, and the latter was prepared artifically by Kallias, of Athens, in the 92 Olympiade. The white colors consisted of carbonate of lead, a white argillaceous mineral from the island of Mylos, and sometimes of chalk. The blue and green colors contained copper and were made by the aid of vinegar, wine must and salt. Bone charcoal was often used for pictures on account of its agreeable shade; wood charcoal was likewise employed. The yellow colors were mainly ocher and yellow oxide of lead The gilding of marble and other objects was well known to the ancient Greeks, and was effected upon metals by the aid of mercury, and upon other articles by means of the white of eggs and of sarcocolla, the *gummy* matter obtained from Penæa mucronata.

Emery and Mirrors.—Emery, *smyris* of the Greek, was called Naxine pulvis, powder of Naxos, by the Romans, who obtained the mineral from that island. It has been found in ancient tombs usually contained in clay vessels, and was doubtless used for polishing the mirrors of which two or three are often found in the tombs of women. These mirrors were made of copper, round or oval, and often had two holes for hanging them up.

For the Destruction of Earth Worms gardeners and others used the decoction of the extremely bitter species of Lupinus, together with the leaves of the oleander and of tobacco, principally of Nicotiana rustica. By using this liquid in watering, the worms are either destroyed or else they descend deeper into the ground, while the useful plants, such as the artichoke, lettuce, radish, etc., are not affected, nor do they absorb the bitterness.

Diseases of Plants.—From the accounts of the ancient writers it seems that the most frequently observed disease was the smut, or dust-brand, which is due to the appearance of a small fungus, Uredo segetum, and was described by Plinius under the name of Ustilago rustica.

Similar diseases are the rust (rubigo), which was called *erysibe*, or *erydibe*, and another appearing upon fruit-bearing trees called *epachnion*, and against all these visitations Apollo and Demeter (Ceres) were implored; hence their names Apollon erysibios and Demeter erysibie.

A very annoying disease appears in Greece upon the fig trees, and frequently not only the fruit, but all branches are found covered with insects which cause the immature fruit to drop off and thus become useless.

The above miscellaneous notes were furnished by Prof. X. Landerer, Athens, Greece.

MINUTES OF THE PHARMACEUTICAL MEETING.

The last pharmaceutical meeting was held on May 15th, 1877, A. P. Brown in the chair. The minutes of the previous meeting were read and approved.

The following publications were donated to the Library: Year-Book of Pharmacy and Transactions of the British Pharmaceutical Conference for 1876; Report of the Jamaica Collection of Products at the International Exhibition, 1876; Report of the State Board of Pharmacy of Rhode Island and Providence Plantations, 1877. From Wallace Procter, 80 volumes of various publications. From Prof. Bridges, 9 volumes Annuaire de Therapeutique.

Donations to the Cabinet: From Prof. Maisch, a specimen of Eryodiction Californicum. From Charles Dodson, of Frederick Brown & Co., a drawing of Larinus maculatus, a beetle, and specimens of the cocoons called, in Persia, *trehala*, and the peculiar sugar *trehalose* contained therein, to the amount of 28·9 per cent., and identical with or closely related to mycose of ergot.

From Jos. Harrop, two samples of subnitrate of bismuth, one of cream of tartar, an iron mortar, and several graduated measures, fractured at the base.

P. P. Fox stated that he made use of such measures by standing them erect in a flat tin box, and filling in around the base with plaster Paris.

P. P. Fox read a paper on Tincture of Kino, which will not gelatinize (see page 299), which lead to some remarks concerning the use, for the same purpose, of a stronger alcohol than directed by the "Pharmacopœia."

C. L. Mitchell exhibited *soluble medicated bougies*, made of gelatin with 10 per cent of glycerin, and medicated with 2 and 3 per cent. of some metallic salts and narcotic extracts; they are introduced under the name of Porte remède, and are intended to replace injections in the treatment of urethral diseases. Many advantages are claimed for this method of medication, which was introduced by M. Regnal, of France, and afterwards patented by certain parties in this country. A similar mass has been previously used for making suppositories and pessaries.

T. S. Wiegand presented a filter support, of galvanized wire gauze. James Kemble utilized broken rubber funnels for this purpose, by piercing them in numerous places with a hot iron. E. M. Boring thought it objectionable to use galvanized iron for some purposes; he presented a sample of colchicum root obtained in this market, the quality of which was very good, none of the pieces being discolored; also 10 oz. of fixed oil of ergot, obtained as a first percolate in making 64 oz. fluid extract of ergot, U. S. P., 1860. Similar observations had been made by other members, and it was supposed to be due to the ergot having been carefully ground at a low temperature. It was stated that the oil obtained in making the fluid extract as ordered in the "British Pharmacopœia," by previously treating with ether, is known commercially as etherial extract.

A. W. Miller exhibited samples of fluid extracts made by Spencer Thomas' process, viz., maceration and expression (see "Am. Jour. Phar.," 1865, p. 81, and 1866, p. 218); also the first, second and third expressions from buchu, and the exhausted drug, which had scarcely any odor and was practically devoid of taste.

Prof. Remington spoke of the prejudice brought about by the advertisements of manufacturers in not using heat in these preparations. He thought few could be found so good as those carefully made in the store. Prof. Maisch also thought the injurious effects of a carefully regulated heat had been much over-rated.

The preservation of drugs was commented upon. For many that contain no volatile matter, paper is preferable to tightly sealed receptacles, also for effervescing powders; and A. W. Miller had found a dry cellar best for fish sounds and dried huckleberries.

Prof. Remington had been spoken to upon the subjects of uniformity in pricing prescriptions and other methods of assisting each other in business matters, and hoped members would consider the matter and, if possible, agree upon a plan to accomplish the object.

William McIntyre exhibited quinia pills made by the method of H. P. Reynolds ("Am. Jour. Phar.," 1874, p. 404), also pills of sulphate of cinchonidia made by the same process, which is also well adapted to this article.

The meeting then adjourned to October 16th, 1877.

WILLIAM MCINTYRE, Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

American Pharmaceutical Association.—The Local Secretary, Mr. Henry J. Rose, informs us that the meeting will be held in the City Council Chamber, which the Mayor of Toronto has kindly placed at the disposal of the Local Committee. It is desired that suitable goods from the United States be sent for the exhibition of pharmaceutical objects, to be held at the same time. Application has been made to the Secretary of the Treasury, and his official reply states "that the law (section 2505 R. S.) admits to free entry articles, *the growth, produce or manufacture of the United States* when returned in the same condition as exported, and when their identity is established by proof prescribed by the Secretary of the Treasury." It

is hoped that many will avail themselves of this provision, and exhibit goods of the above description, in addition to those which may be shown by our Canadian friends. Goods from the United States, for the above purpose, will enter Canada in bond. The Permanent Secretary expects soon to be in possession of the necessary details for facilitating the exportation and re-importation of these goods, and will communicate them by circular to all who may desire to exhibit. It is desirable that application for space be made to the Local Secretary, Mr. Henry J. Rose, Toronto, *as early as possible* before August 15th.

We are also informed that the Grand Trunk Railway will issue round-trip tickets from any station on their line to Toronto and return at one and one-third ($1\frac{1}{3}$) fare. For many members Niagara Falls will be the natural place of rendezvous on Saturday and Sunday preceding the meeting. Some members have expressed a desire to return by way of Montreal, Lake Champlain and Saratoga, others by way of Montreal and Boston. Those returning by way of Niagara can obtain tickets between that place and Toronto, by boat across Lake Ontario, at $3.00 for the round trip. Other arrangements are contemplated, and due notice will be given. Any suggestions in regard to the trip will be gladly received by the Secretary, who requests all candidates for membership to mail their applications to him or to the Chairman of the Executive Committee at as early a date as possible.

Louisville College of Pharmacy.—The following-named gentlemen having passed a successful examination at the end of the session, were by the Board of Directors declared Graduates in Pharmacy, viz.: Otto E. Mueller, G. Bollinger, Thos. P. Taylor, Adolph E. Kunz, F. J. Stibley, Frank A. Henry, Jr, Henry Buschmeyer, Jr., F. H. Wolpert. The first-named gentleman, having obtained the highest average in the examination, received the Gold Medal, presented by the Alumni.

At the Annual Meeting, held Tuesday, March 14th, 1877, the following Board of Directors was elected: C. L. Diehl, Emil Scheffer, Vincent Davis, Fred. C. Miller, B. Buckle, John Colgan, J. A. McAfee, Ed. C. Pfingst, Louis Eichrodt, Geo. A. Newman, C. Tafel, Wm. W. Smith. At the meeting of the Board of Directors held the same day, the following officers were elected: President, C. Lewis Diehl; Vice Presidents, Emil Scheffer and Vincent Davis; Corresponding Secretary, Louis Eichrodt; Recording Secretary, Fred. C. Miller; Treasurer, Edward C. Pfingst; Curator, J. A. McAfee.

Pharmaceutical Society of Ireland.—At a meeting held in Dublin, April 3d, Dr. A. Smith in the chair, Dr. E. Davy read a paper *On the application of the molybdenum test to certain adulterations of essential oils*, in which it is suggested to detect alcohol in volatile oils by agitating the latter with an equal bulk of water, and after separation bringing a few drops of the water in contact with a solution of molybdic acid in sulphuric acid, contained in a white capsule, and slightly warmed, the temperature not to exceed 212°F. In the presence of alcohol a blue color will instantly appear; water agitated with pure volatile oils has no effect. The author employed a test-tube, drawn out to a fine point like a pipette.

Mr. R. J. Downes examined *Singleton's Golden Eye Ointment*, and found it to be

free from arsenic; the fatty base appears to be mutton suet combined with 12 per cent. oxide of mercury. He also criticized the use of yellow wax in the officinal *Ung. Hydrarg. oxidi rub.*, but overlooked the fact that it has greater preservative properties than white wax; as a base for this ointment he recommended vaselin.

Dr. Auchinleck gave a description of the *aloes* plants found in Egypt, and of the method adopted in collecting and preparing the juice for the market.

A specimen of a *spurious long buchu*, consisting of the leaves of Empleurum serrulatum, was exhibited at this meeting.

The British Pharmaceutical Conference will hold its next annual meeting in Plymouth, commencing on Tuesday, August 14, at 10 A.M.

Pharmaceutical Society of Paris.—Mr. Haaxman reported at the March meeting on the preparation of neutral tannate of quinia, and Mr. Husson on the detection of *foreign coloring matters in wine*, maintaining his previous statement that they are not precipitated, but partly altered on the addition of sugar of lead and alum. A communication of Mr. Bretet corroborated the precipitation of arsenic from *Fowler's Solution* as previously observed by Menière ("Am. Jour. Phar.," 1876, p. 217); the difference by titration with iodine was, however, greater than the weight of the sediment. Mr. Vigier proposed in preparing that solution to substitute the aromatic spirit by alcohol.

The following articles were exhibited: *Sebo de Palo*, a fat said to be obtained from a seed, is used in Brazil for killing vermin; *Boracic acid*, contaminated with a considerable proportion of lead, and *muriate of pilocarpina*, which was obtained by Mr. Petit in colorless crystals by evaporation in vacuo.

Society of the Apothecaries of Berlin.—At the meeting of April 17th, Dr. Schacht discussed the characteristics of *reduced iron*, as given by the different pharmacopœias, and the various methods suggested for determining the impurities, by measuring the hydrogen gas evolved on dissolving in an acid, and by weighing the undissolved portion after digestion or maceration with solutions of iodine, bromine and ferric chloride. The best results were obtained by macerating, at the ordinary temperature, a weighed sample of the reduced iron with bromine water, or with solution of bromine in potassium bromide, or with solution of ferric chloride, sp. gr. 1·30; the results of the former method, as compared with those of the last one, did however not sufficiently correspond with each other. The author believes, however, that a good reduced iron should be characterized as follows: "A very fine grey powder, without gloss; when heated in the air it burns to ferric oxide. It is completely soluble in warm diluted pure muriatic acid, with the evolution of hydrogen, which is indifferent to lead paper. When treated for half an hour, at the ordinary temperature and with occasional agitation, with 25 times its weight of solution of ferric chloride, sp. gr. 1·30, it is completely dissolved."

Mr. Hobe directed attention to the very variable proportions of drugs as directed for the *syrups* of the "German Pharmacopœia," many of which will not keep for a reasonable length of time. He opposed the addition of salicylic acid because too

large a quantity is necessary to prevent fermentation, but suggests the addition of a small quantity of alcohol, as at present directed for the syrups of ipecac and senega. For the preparation of *purified honey*, the same author suggests to accomplish the final evaporation in small quantities only, in order to obtain it light-colored.

Mr. Kobligk reported his experience with the preparation of *phosphoric acid* by Markoe's process ("Am. Jour. Phar.," 1875, p. 524 and 529), and does not believe it adapted to replace the process by nitric acid, as used heretofore.

EDITORIAL DEPARTMENT.

The Revision of the Pharmacopœia.—Dr. Squibb's plan for the future revision of the "United States Pharmacopœia" has been before those interested for abont a year. It was brought forward at the meeting of the American Medical Association in 1876, and has been acted on at the last meeting of the same Association, held in June, in Chicago. On a former occasion we stated that in our opinion the societies having a right to participate in such a revision should be heard on the subject; but aside from those that have been previously alluded to, but few have taken action that became public previous to that meeting; among them we may mention the colleges of pharmacy at Washington and Chicago, both being opposed to the general plan of revision as contemplated. The President of the American Medical Association, Dr. Henry J. Bowditch, of Boston, in his opening address, discussed the proposition in an impartial manner, weighing the various arguments and arriving at the conclusion that the Association was not prepared to adopt any new plan and had better defer action for another year. The subject was discussed by the Association on Thursday, June 7th, and a motion of Dr. N. S. Davis to indefinitely postpone the whole matter was carried amid loud applause.

The American Medical Association, in our opinion, has acted very wisely. It cannot be otherwise but that greater unity and increased interest will be secured for the next revision of the "Pharmacopœia," and if that interest be manifested by personal labor on the part of those who in the past had so much fault to find, Dr. Squibb's agitation of the subject will have accomplished what could scarcely have been expected through any other means.

Professor Theo. G. Wormley, M. D., formerly of Columbus, O., we are pleased to learn has been elected to fill the vacancy in the chair of chemistry of the medical department of the University of Pennsylvania, in this city, occasioned by the resignation of Prof. Rogers, who has been elected to the same chair in the Jefferson Medical College. Prof. Wormley is well known to our readers as a contributor to this journal, and as the author of that valuable work, "Microchemistry of Poisons." He has our hearty good wishes for success in his extended new field of labor.

Warburg's Tincture Once More.—We did not think that one of the asserted ingredients of the above tincture, which has recently gained such prominence, would possess sufficient interest for our readers; but having received many requests

for copies of the formula, we believe that our readers will value it, if only as a curiosity. The following has been copied from the "London Pharmacopœia" of 1746, and we may add that the "Edinburgh Pharmacopœia," also, contains a formula giving three more ingredients:

MITHRIDATUM S. CONFECTIO DAMOCRATIS.

℞. Cinnamon, 14 *drachms*; myrrh, 11 *drachms*; agaric, Indian nard, ginger, saffron, seeds of Mithridate mustard, frankincense, Chio turpentine, *each* 10 *drachms*; camel's hay, costus (or, in its stead, zedoary), Indian leaf (or, in its stead, mace), stechas, long pepper, hartwort seeds, hypocistis, storax (strained), opopanax, galbanum (strained), opobalsam (or, in its stead, expressed oil of nutmegs), Russia castor, *each one ounce*; poley mountain, scordium, carpobalsam (or, in its stead, cubebs), white pepper, candy carrot seed, bdellium (strained), *each* 7 *drachms*; Celtic nard, gentian root, dittany of Crete, red roses, Macedonian parsley seed, lesser cardamom seeds (husked), sweet fennel seed, gum arabic, opium (strained), *each* 5 *drachms*; calamus aromaticus, wild valerian root, aniseed, sagapenum (strained), *each* 3 *drachms*; meum athamanticum, St. John's wort, acacia (or, in its stead, terra japonica), bellies of skinks, *each* 2½ *drachms*; clarified honey, *thrice the weight of all the other ingredients*.

Warm the honey and mix with it the opium dissolved in wine; melt the storax, galbanum, turpentine and opobalsam (or expressed oil of nutmeg), together in another vessel, continually stirring about to prevent their burning; with these, so melted, mix the hot honey, at first by spoonfuls, and afterwards in larger quantities at a time; when the whole is grown almost cold, add, by degrees, the other spices, reduced into powder.

Looseness in Writing Prescriptions.—Quite a number of our cotemporaries have recently commented upon a prescription and the manner in which it was compounded; carelessness on the part of the prescriber and dispenser resulted in endangering the life of a lady, which was fortunately saved by the prompt administration of antidotes. The prescription was as follows: "℞. Hydrarg. chloridi, gr. vi; Pulv. Opii, gr. i. Put together in one paper." The clerk, supposing the medicine to be intended for external use, dispensed corrosive sublimate, without, however, labeling "Poison," or "for external use." In this he was clearly negligent or careless; in our opinion, he had no right to put up the prescription without first ascertaining the intention of the prescriber, or, if that was impossibble, he should have dispensed the weakest preparation—in this case calomel—unless the object of the physician could be clearly discerned from the directions. But there were *no directions*, and here it is where, in our opinion, the greatest censure should attach. Had the prescription been marked "One dose" or "Take at once," the mistake would not have happened; for we have not noticed that the clerk's knowledge had been questioned.

Unfortunately, a very large percentage of prescriptions are written in the same loose manner. Some years ago we had an argument with one of the most prominent men of the medical profession, whose care and exactness are widely known; the subject was the advisability of adopting a posological table containing the max-

imum doses of poisonous preparations, and we well remember his astonishment when another pharmacist corroborated our statement, that the majority of prescriptions written were without any indication as to the use of the medicine or the age or sex of the patient. "But then the prescription is not complete," he remarked, and we fully agree with the venerable gentleman. To err is human, and physicians are not exempt from this rule; prescriptions should be written so that the dispenser cannot doubt the intention of the prescriber, and that no necessity may exist for questioning the messenger. The latter course is frequently of no avail, since servants or children are rarely able to state how or in what dose the medicine is to be used; and, in our opinion, pharmacists should abstain from asking questions concerning the progress of the disease or the use of the medicine, except in so far as their friendly relations to the customer may warrant, or an incidental omission of the prescriber may necessitate. The latter case will rarely arise if the physician *completes* his prescription, by stating the dose and its frequency, and mentioning, approximately, the age of the patient, for which purpose names are not necessary; the object will be attained by marking the prescription "for the baby," "for the child," "for Mr. N's daughter," for Master N.," etc.

OBITUARY.

Joseph Bienaime Caventou, honorary Professor in the Paris School of Pharmacy, died at Paris in May last, at the ripe age of 82 years. He was born in 1795, and while an *interne* at the Pitié attracted attention in 1816 by a note upon the properties of different species of Narcissus, and subsequently made many of his investigations together with Pelletier. The discovery of a number of the most important alkaloids is a result of their joint labors, namely: strychnia in 1818, brucia in 1819, and about the same time, cotemporaneously with Meissner, veratria; in 1820 quinia and cinchonia; in 1821, cotemporaneously with Robiquet and Runge, caffeina, which had been previously known only in an impure condition. About the same time Caventou investigated the physiological functions of the chlorophyll contained in the green parts of plants. He was admitted to the Academy of Medicine at its foundation in 1823, and served as its dean at the time of his death. In 1826 he was selected for the chair of toxicology in the School of Pharmacy and resigned in 1857, notwithstanding the representations of his colleagues and pupils. For nearly twenty years he lived in modest retirement, and though, in accordance with his last wishes, no military honors were rendered to him and no discourse was pronounced over his tomb, his obsequies on May 7 were attended by all the members of the Academy of Medicine and of the School of Pharmacy. He was, indeed, one of the most worthy representatives of French science.

Edward McInall, Sr., a prominent apothecary of Wilmington, Del., died there May 12, of congestion of the brain, in the fifty-first year of his age. He learned the business with Mr. Edw. Bringhurst, and remained with him until he commenced business on his own account, in 1846.